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A Guide to the Deep-Sea Shrimp and Shrimp-Like Decapod Crustacea of Atlantic Canada

G. Pohle

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St. Andrews, N.B. E0G 2X0

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A GUIDE TO THE DEEP-SEA SHRIMP AND SHRIMP-LIKE DECAPOD CRUSTACEA OF ATLANTIC CANADA

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ABSTRACT

Pohle, G. 1988. A guide to the deep-sea shrimp and shrimp-like decapod Crustacea of Atlantic Canada. Can. Tech. Rep. Fish. Aquat. Sci. 1657: iv + 29 p.

Forty-five species of shrimp or shrimp-like decapod Crustacea known to occur, or likely to be encountered, in the Canadian Atlantic, are described. Included are penaeidean shrimps (families Aristeidae, Sergestidae), caridean shrimps (families Oplophoridae, Nematocarcinidae, Pasiphaeidae, Hippolytidae, Pandalidae, Crangonidae), lobsterettes (Polychelidae), mudshrimps (Axiidae) and squat lobsters (Galatheidae) which commonly occur at depths of greater than 200 m. Multiple character comparisons are used for the differentiation between higher decapod groups, families, genera and species. Distinguishing morphological features are identified on the illustrations and notes on color, size, environmental temperatures, bathymetric and geographic ranges are included with species accounts. Also provided are a glossary of technical terms used in decapod taxonomy, a selected bibliography of references useful in identifying decapods, and an appendix with a key for the differentiation between decapods and other non-decapod shrimp-like Crustacea. Descriptions are for the most part based on original material obtained on various cruises by the Department of Fisheries and Oceans Canada and are deposited at the Atlantic Reference Centre, St. Andrews, New Brunswick, Canada.

RÉSUMÉ

Pohle, G. 1988. A guide to the deep-sea shrimp and shrimp-like decapod Crustacea of Atlantic Canada. Can. Tech. Rep. Fish. Aquat. Sci. 1657: iv + 29 p.

Le présent rapport décrit quarante-cinq espèces de crevettes ou autres crustacés du genre de la crevette que l'on retrouve - ou que l'on peut retrouver - dans les eaux canadiennes de l'océan Atlantique. La liste inclut la crevette penaeide (des familles aristeidae et sergestidae), la caridine (des familles oplophoridae, nematocarcinidae, pasiphaeidae, hippolytidae, pandalidae, crangonidae), les polychelidés, l'axius et la galathée, qui habitent communément à des profondeurs de plus de 200 mètres. On utilise des comparaisons portant sur des caractères multiples pour faire la distinction entre les groupes, familles, genres et espèces de décapodes plus évolués. Les caractéristiques morphologiques distinctifs sont inscrits sur les illustrations et les dénombrements d'espèces sont accompagnés de notes sur la couleur, la taille, les températures environnementales ainsi que les variations bathymétriques et géographiques. Le rapport contient aussi un glossaire de termes techniques utilisés dans la taxonomie des décapodes et une bibliographie sélective d'ouvrages de référence utiles à l'identification des décapodes. A l'annexe, on retrouve une légende afin de faire la distinction entre les crustacés décapodes du genre de la crevette et les crustacés non décapodes. La plupart des descriptions sont fondées sur du matériel original provenant de diverses excursions effectuées par Pêches et Océans Canada et déposées au Centre Référence Atlantique, à St. Andrews, Nouveau-Brunswick, Canada.

INTRODUCTION

The 8500 described decapods represent the largest and most varied order of crustaceans, encompassing about one-third of known crustacean species and ranging in size from a few millimeters to several meters. The familiar shrimp, lobster, crayfish and crab, which represent the two basic body plans, belong to this group. This guide covers long-tailed shrimp or shrimp-like decapods whose elongated body includes a more or less extended abdomen with terminal tail fan. Among this group are species of economic importance, several of which are used for human consumption. Most of the species included here commonly occur at depths of greater than 200 m. Also described are some species resembling those of deeper waters but which are rarely found below 200 m. Crabs, the short-tailed decapods with a flat abdomen permanently bent under the body and without a tail fan, have been excluded.

There is a need for the ecologist, non-specialist taxonomist and technical personnel to be able to identify organisms without having to refer to the specialized, detailed and scattered primary literature. Identification manuals with keys are available for some of the more common shallow-water decapod crustaceans (e.g. Williams 1974) but there is presently no single guide for the less well known deep-water species from the Northwest Atlantic. This guide is based on the format of Species ID Leaflets of the Atlantic Reference Centre (ARC), Huntsman Marine Science Centre. It is designed to enable quick field identifications of species, particularly among sets of similar looking species. This guide represents a distillation of information from the latest primary systematic literature, along with ARC field and laboratory observations. It is written for the widest possible use and should be useable regardless of level of expertise in taxonomic identifications and familiarity with taxonomic jargon. Thus, it is designed to supplement formal and more technically oriented references, which are often impractical or impossible to use in the field. This manual does not claim to be, nor can it by its nature be, authoritative, definitive or comprehensive taxonomically. When using this guide, all tentative identifications should consequently be cross-checked with more detailed descriptions (see literature cited) or, when definitive ID is required, the material should be referred to appropriate taxonomic specialists for final determination. For each species, the scientific name, by convention, always appears italicized (underscored) and here also in bold-face type, followed by the author who originally described the species and the date of publication. If taxonomic changes have taken place subsequently to the authors' description, author and date are enclosed in parentheses. Scientific names used reflect recent taxonomic changes; often these updated names appear in published faunal guides. Common or vernacular species names are provided to the right of scientific names whenever available. It should be remembered, however, that these names tend to vary depending on locality and have been a source of confusion in the past. The vernacular names given here agree with a checklist of North American common names to be published by the American Fisheries Society. Geographic coverage in this guide includes all the known species of Canadian Atlantic waters from the Scotian Shelf (Latitude 43°N) to the Arctic but, as many deep-water species have relatively wide distributions, there is considerable overlap with more southerly areas.

The present guide is based on two major sources of information:

1. Material primarily collected by the Department of Fisheries and Oceans Canada, housed in the phylogenetic collection of the Atlantic Reference Centre in St. Andrews. The crustacean collection consists of about 3000 lots (10,000+ specimens).

2. Published descriptions from various faunal guides as well as the primary literature.

HOW TO USE THIS GUIDE

The novice is encouraged to become familiar with features of the group before proceeding to attempt identification by using the introductory text and accompanying generalized diagram below. A glossary (page 27) is provided for quick reference to definitions of technical terms and the appendix helps in the differentiation between decapods and other non-decapod shrimp-like Crustacea not covered in this guide. The guide is based on several sections, separating larger groups into more specific subsets, until arriving at a species. For all sections accounts follow a general format by placing comparable information in the same relative position. To identify a specimen, first proceed to the section (page 3) separating the five major groups of decapod crustaceans covered here. Depending on the particular group, up to three separate sections follow, distinguishing families, then genera and species. It must be remembered that specimens are often damaged or otherwise incomplete and this may therefore lead to misidentification. Legs may be missing but bases usually remain intact and must be taken into account when locating a particular appendage. The rostrum and, less often, the telson may also be broken, especially in species in which such structures are particularly long. Descriptions may also not fully agree with undamaged specimens. Morphological variations are especially likely to be encountered in juveniles which have not fully developed all adult structures. Comparable information is placed in the same relative position in each description and usually differs for at least two of the cases per given group. For a better understanding, descriptive text should always be used in conjunction with illustrations.

Diagnostic morphological characters included are of two types (Note: character differences among species treated in this leaflet may not prove valid outside the Canadian Atlantic region):

1. Field characters - these include gross details (such as color of the living animal, size, shape, relative positions and armature of appendages, etc.) that can often be utilized without the aid of laboratory equipment. Such characters may not prove definitive in all cases, but will generally suffice for tentative identification and separation of similar taxa at sea or when rough sorting in the laboratory.

Size may be given as carapace length (measured from the posterior middorsal margin to posterior-most part of eye socket, unless otherwise stated) or total length (from tip of rostrum to tip of telson of fully extended shrimps).

2. Laboratory characters - in addition to details of gross anatomy, these include smaller morphological details which usually require examination by dissecting microscope. Such characters are denoted in brackets.

Notes on coloration are based on live or freshly caught specimens and cannot therefore be used when examining preserved material (color changes or fades on preservation). Supplementary habitat information useful in confirming identifications may be given following the list of diagnostic characters. Size, depth, environmental temperature and geographic distribution can be helpful in separating species. Line drawings are provided to illustrate and compare details listed in the text; important features are marked and identified. Most illustrations have been drawn from the literature but often include some modifications. Figures for some species without suitable illustrations were drawn from preserved specimens. Each genus is represented with at least one whole animal illustration, individual species are shown with those body parts essential in the identification.

MORPHOLOGICAL DESCRIPTION

This leaflet covers the long-tailed deep-sea decapods (see Fig. 1, p. 3 for terminology). All members of this group have a narrow and extended abdomen which never completely folds up against the ventral surface of the anterior cephalothorax. Segments of the cephalothorax are covered by the carapace, consisting of fused dorsal segments of the head and thorax overhanging laterally to enclose the gills. The carapace is produced into a rostrum anteriorly. In swimming decapods the rostrum is often well developed, whereas in bottom-dwelling species it may be reduced to a short plate or spine; the armature of the rostrum and other exterior ornamentations of the carapace, such as ridges, grooves or hairs, are useful taxonomic characters. Antennules, which are the first pair of appendages below the stalked eyes, have a basal stem or peduncle made of the first three segments followed by usually two flagella of various lengths. The antennae consist of 2-5 peduncular segments and extend distally into a whip-like multiarticulated flagellum. On the second peduncular segment antennae often carry an outer branch resembling a broad plate or scale. The anterior mouthparts are formed by the mandibles, maxillules and maxillae (not shown), followed by the first three pairs of thoracic appendages known as maxillipeds. The outermost third maxilliped often resembles a leg. The remaining five pairs of thoracic appendages (pereiopods) comprise the true legs from which the name Decapoda (ten feet) is derived. Depending on the particular group, one or more of these appendages are distally modified into pincers (chelae) and the outer branches (exopods) may be missing. The posterior elongate abdomen consists of six well developed mobile segments bearing five pairs of pleopods which function as two-armed swimming appendages. Terminally on the abdomen there is a tail fan, consisting of a central telson and lateral uropods. The first and second pleopods of the abdomen may bear additional reproductive structures. Decapod reproductive structures are mostly indistinct and variable, depending on the stage of development and the particular group of shrimp, and therefore beyond the scope of this guide. On all shrimps, reproductive apertures for ovaries and testes are located between the bases of third and fifth pairs of legs, respectively. Mature female caridean shrimps carry eggs on abdominal pleopods until hatching, but penaeideans release their fertilized eggs into the seawater. To ascertain the sex by other characteristics, the reader is referred to the more detailed literature (e.g. Butler 1980). Refer to the glossary (p. 27) for the definition of other terms.

HOW TO DISTINGUISH PENAEIDEAN, CARIDEAN, POLYCHELID, AXIID AND GALATHEID CRUSTACEA:

PENAEIDEAN SHRIMPS - [page 3] - Carapace and abdomen compressed (flattened laterally); abdomen considerably longer than carapace; side of second abdominal segment **does not overlap** plate of first segment; third legs with pincers; eyes normally developed, set on movable stalks; gills made of shaft with two opposite rows of finger-like main branches bearing sub-branches.

CARIDEAN SHRIMPS - [page 7] - Carapace and abdomen compressed; abdomen considerably longer than carapace; side of second abdominal segment **overlaps** plate of first segment (dotted area Fig. 1); third legs without pincers; eyes normally developed, set on movable stalks; gills made of stacked flat sheets.

POLYCHELID LOBSTERS (BLIND LOBSTERS, LOBSTERETTES) - [page 21] - Carapace and abdomen somewhat depressed (flattened top to bottom); abdomen about as long as carapace; side of second abdominal segment overlaps that of first segment; first four pairs of legs with pincers; eyes rudimentary, eyestalks immovable; gills made of shaft with unbranched filaments.

AXIIDS (MUD SHRIMPS) - [page 23] - Carapace compressed; abdomen longer than carapace; side of second abdominal segment does not overlap that of first segment; abdomen extended; third legs without pincers; eyes with or without pigments; some gills made of shaft with unbranched filaments.

GALATHEIDS (SQUAT LOBSTERS) - [page 24] - Body shrimp-like or lobster-like; carapace and abdomen somewhat depressed; abdomen about as long as carapace; side of second abdominal segment does not overlap that of first; abdomen curled ventrally but not folded up against thorax; third legs without pincers; fifth legs modified and reduced, smaller than others; gills made of stacked flat sheets.

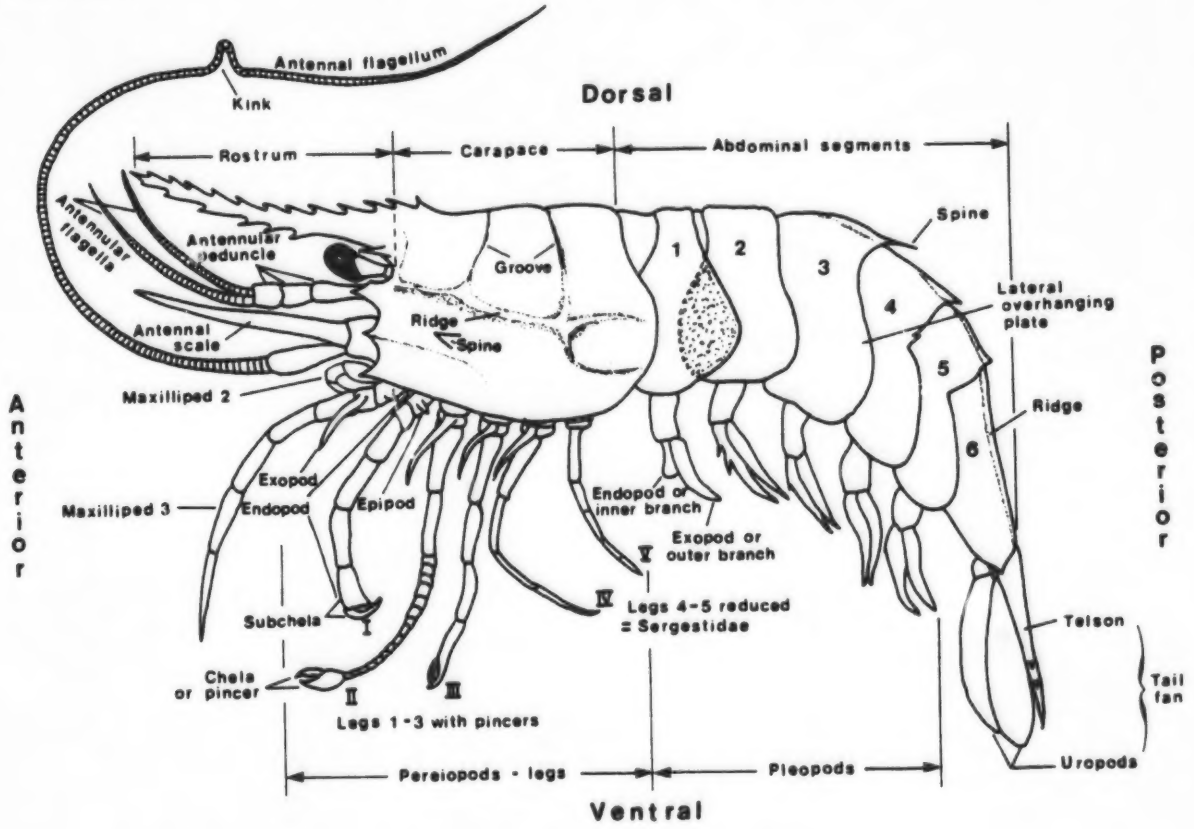


Fig. 1. Generalized diagram of hypothetical shrimp.

HOW TO DISTINGUISH THE FAMILIES OF PENAEIDEAN SHRIMPS:

Aristeidae [p. 4] - 5 pairs of legs well developed, first 3 with pincers; at least 11 gills per side.

Sergestidae [p. 6] - last 2 pairs of legs small or absent, second and third with very small pincers; gills not more than 7 per side, sometimes absent.

FAMILY ARISTEIDAE

HOW TO DISTINGUISH THE SPECIES:

1) **Pleoticus robustus** (Smith, 1885) **Royal red shrimp**

- color variable from mostly opaque white to salmon, to pink and red
- eyes large, with scale-like dorsal projection
- carapace covered with short hairs; with middorsal ridge ending in small spine or tooth; 5 lateral spines, including small spine at base of rostrum and eye; 2 adjacent lateral ridges and grooves
- rostrum medium long, reaching to about end of antennular peduncle; with lateral ridge and 10-12 dorsal spines extending onto carapace
- antennular flagella both long but unequal in length
- exopod of maxilliped 2 very short, not visible
- abdominal segments also covered with short hairs; segment 3-6 with middorsal ridge ending in small spine on segment 6 only
- carapace length to 42 mm males, 61.5 mm females; total length to 173 mm males, 219 mm females
- benthic, occurring on silty bottoms of upper continental slope
- 180-730 m, usually below 250 and above 500 m, 5-15°C
- commonly encountered from 35°N (Cape Hatteras) to French Guiana but occasionally extending to 43°N (Scotian Shelf)

2) **Benthesicymus bartletti** Smith, 1882

- bright red, more intense on carapace
- carapace with lateral ridges; single spine below eye
- keel-like short rostrum with sharp point in front of 2 dorsal spines
- upper flagellum (branch) of antennule long, about equal to lower flagellum
- abdominal segments 5 and 6 with dorsal ridge, middle of segment 5 with long slender spine extending back to segment 6
- carapace length to 22 mm male, 34 mm female; total length to 115 mm
- benthic, depth range 609-5777 m
- Latitude 46°N to Bahamas

3) **Gennadas elegans** (Smith, 1882)

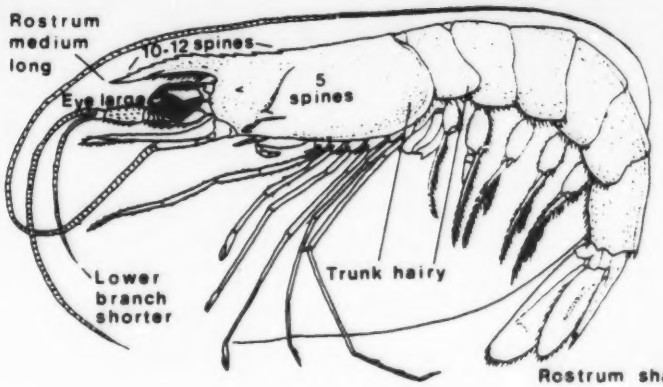
- carapace and abdomen red; carapace with dark brownish tint at front, abdomen paler than carapace; legs dark brownish-red; with patches of deep blue
- carapace with lateral ridges, single spine below eye
- rostrum very short, with dorsal ridge on carapace bearing a single spine
- eyestalks about 1/4 carapace length, bearing conspicuous spine
- flagellum of antenna longer than rest of animal; other flagella short
- segment 4 (merus) of third leg longer than segment 5
- abdominal segments lacking spines; only abdominal segment 6 dorsally ridged, others smoothly rounded
- elongate telson (with lateral spines and with squared-off end bearing numerous setae which are shortest laterally)
- carapace length to 10 mm males, 11 mm females; total length to 43 mm
- pelagic, Latitude 62° (Davis Strait) to 31°N.
- 200-695+ m

4) **Gennadas valens** (Smith, 1884) [no specimens examined]
as *G. elegans* except:

- carapace projection below eye blunt, not produced into a pointed spine
- rostrum with longer tip than in *G. elegans*
- eyestalks long, more than 1/4 carapace length, bearing longer dorsal spine
- segment 4 (merus) of third leg shorter than segment 5
- total length 45-48 mm
- pelagic, Latitude 49°N to Gulf of Mexico
- 100-1500+ m, at night mostly 200-400 m, during the day 750-950 m

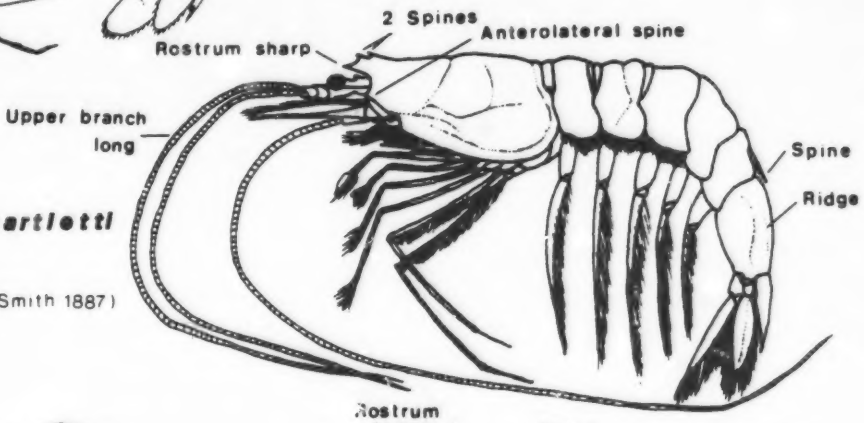
5) **Plesiopenaeus edwardsianus** (Johnson, 1867) **Scarlet shrimp, Gambon écarlat**

- brilliant crimson red, more intense on carapace and dorsally on abdomen; fringes of setae gold colored
- several lateral ridges on carapace, one with single anterior spine
- long sharply pointed rostrum equal to at least 1/2 carapace length; 3 dorsal spines
- upper antennular flagellum very short, other flagellum very long, up to 3 times total body length; antennal flagellum also very long
- maxilliped 2 and 3 with exopod, that on maxilliped 2 very long (twice as long as endopod) and feathery
- abdominal segments 3-6 dorsally with ridge, forming short spine at end of each segment
- a very large species, carapace length to 55 mm males, 104 mm females; total length to 193 mm males, 334 mm females
- benthic, inhabiting muddy bottoms on continental slopes
- 274-1850 m (mostly 400-900 m), 4-8°C
- Latitude 47°N (Gulf of St. Lawrence) to Gulf of Mexico



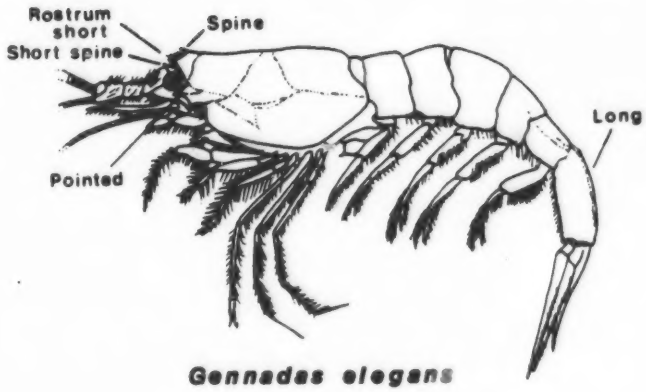
Pleoticus robustus

(after Perez Farafante 1988)

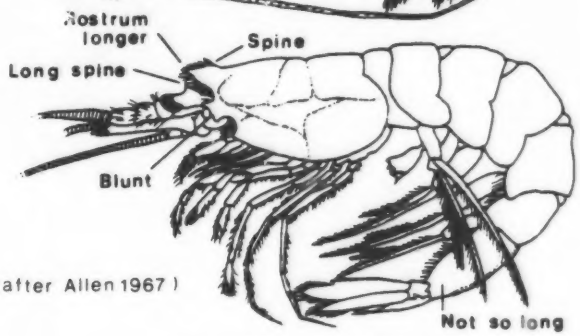


Benthesicymus bartletti

(after Smith 1887)

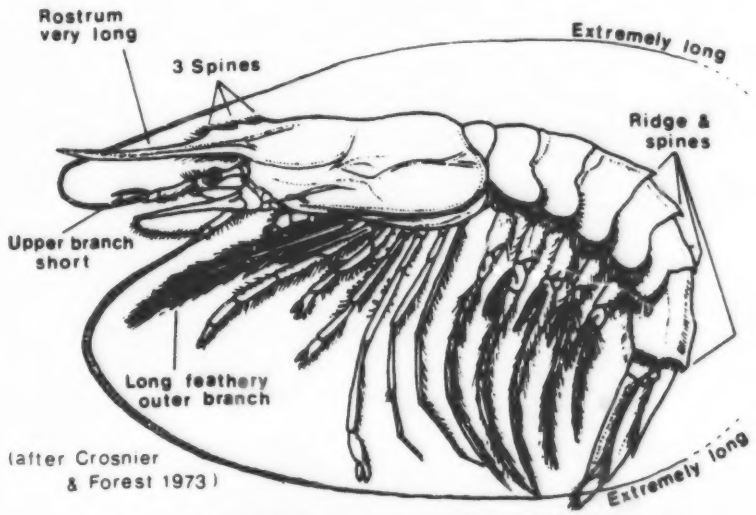


Gennadas elegans



(after Allen 1967)

Gennadas valens



(after Crosnier & Forest 1973)

Plesiopenaeus edwardsianus

FAMILY SERGESTIDAE

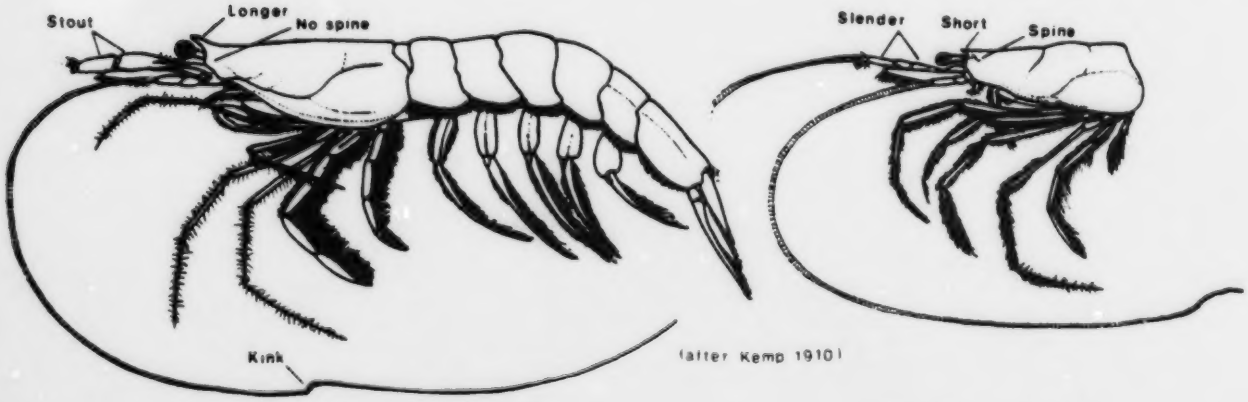
HOW TO DISTINGUISH THE SPECIES:

1) **Sergia robusta** (Smith 1882)

- uniform clear scarlet, with bluish reflections most conspicuous on front portions of carapace but also present on rest of carapace and abdomen
- carapace more than 1/2 length of abdomen, without spines; first transverse groove behind eyes very faint or absent (well marked in S. arcticus)
- laterally compressed rostrum about 2/3 length of eye; no flanking spines at base
- eyes shorter and less slender than in S. arcticus
- segment 2 and 3 of antennular stalk very stout
- antennal scale about 1/2 length of carapace, less than 3 times as long as wide; antennal flagella very long, with distinct kink or bend (see figure below)
- abdominal segments smooth, segment 6 about 1.5 times length of segment 5
- telson about 2/3 length of abdominal segment 6 (with pair of dorsolateral ridges, fringe of hairs along lower margin and sharp terminal spine)
- carapace length to about 27 mm; total length 55-90 mm
- pelagic to just off the bottom
- depth range 150-4600 m
- Latitude 45° to 34°N

2) **Sergestes arcticus** Krøyer, 1859

- largely milky white and translucent, with areas of red pigmentation (most intense middorsally on carapace, fading laterally and towards abdomen)
- carapace, dorsally rounded, more than 1/2 length of abdomen (excl. telson), with spine on ridge above eye; with grooves, first one transverse behind eyes (lacking in S. robustus)
- rostrum very short, reaching only basal articulation of eyestalks (flanked by short spines on ridge at base)
- eyestalks long and slender
- segment 2 and 3 of antennular stalk slender
- antennal scale more than 1/2 length of carapace, more than 3 times as long as wide; antennal flagella very long with distinct kink or bend (Fig. 1)
- abdominal segments smooth; segment 6 long, 2.5 times length of segment 5
- (telson without sharp terminal spine)
- carapace length to 19 mm males, 20 mm females; total length 28-65 mm
- pelagic, depth range 175-4500 m at temperatures of 2-8°C (mostly 3.5-4.5°C)
- Latitude 45° to 35°N (65°N between Iceland and Greenland)



Sergia robusta ***Sergestes arcticus***

HOW TO DISTINGUISH THE FAMILIES OF CARIDEAN SHRIMPS:

Oplophoridae [p. 8] - Body compressed; carapace with or without ridges, with spines; rostrum variable; regular pincers possessing immovable finger on legs 1 and 2; leg 2 with segments not subdivided; all legs with outer branch (exopod); last 3 pairs of legs without pincers, not unusually long, third to last segment (carpus) shorter than second to last (propodus).

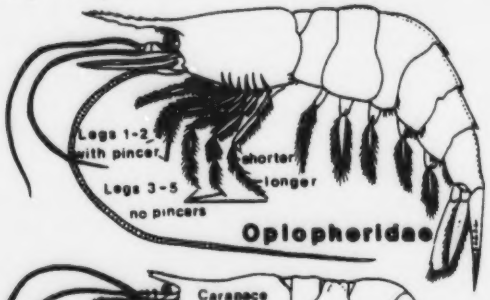
Nematocarcinidae [p. 12] - Body compressed; carapace without ridges, with spines; rostrum armed with multiple small spines; regular pincers on legs 1 and 2; second legs segments not subdivided; legs 1-4 proximally with small outer branch; last 3 pairs of legs without pincers, enormously lengthened, next to last segment at least 5 times longer than last segment (trawled specimens with portion of legs distally to characteristic swollen joint between segments 3 and 4 often missing).

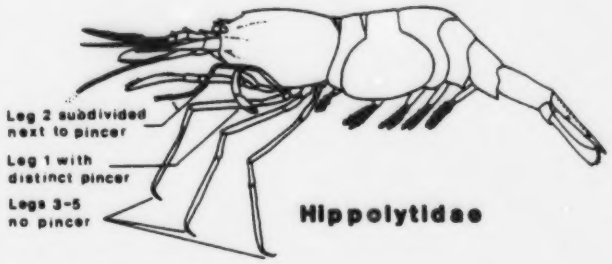
Pasiphaeidae [p. 13] - Body strongly compressed (flattened laterally); carapace with ridges and spines; rostrum short, unarmed; first 2 pairs of legs large, strong, and with regular pincers; second leg segments not subdivided; last 3 pairs of legs weaker, shorter, narrower and without pincers; all pincers with cutting edges bearing comb made of fine sharp teeth; outer branch on maxilliped 3 and all legs.

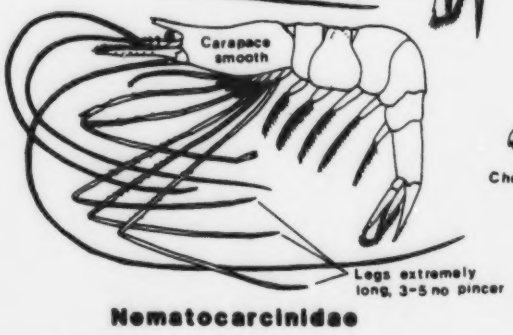
Hippolytidae [p. 14] - Body compressed; carapace and rostrum variable (single northern deep-water genus with short rostrum flanked by lateral spine); first two pairs of legs with regular pincers lacking sharp teeth; second pair of legs wrist segment next to pincer subdivided into multiple (usually 3 or 7) secondary segments; legs 3-5 without pincers, not unusually long; maxilliped 3 with or without outer branch, legs without outer branch (exopod).

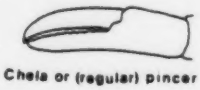
Pandalidae [p. 15] - Body compressed; carapace without ridges, with spines; rostrum long, compressed and armed with spines; first pair of legs without pincers (if present, microscopically small); second leg subdivided into smaller, jointed secondary segments proximal to pincers; legs 3-5 without pincers, not unusually long; maxilliped 3 with or without, legs without, outer branch.

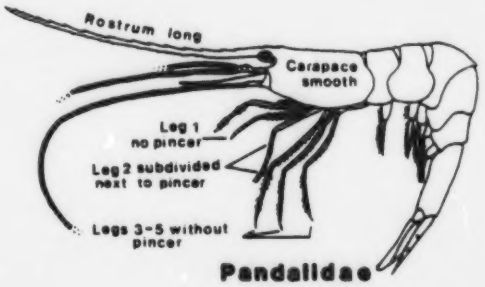
Crangonidae [p. 18] - Body relatively depressed (flattened top to bottom); carapace with ridges armed with spines; rostrum variable; pincers of first pair of legs forming a subchela, i.e. with movable finger folding down or back onto palm which lacks a fixed finger; second leg simple or with microscopic pincer, segments not subdivided; legs 3-5 without pincers, not unusually long; proximal short outer branch (exopod), if present, on leg 1 only.

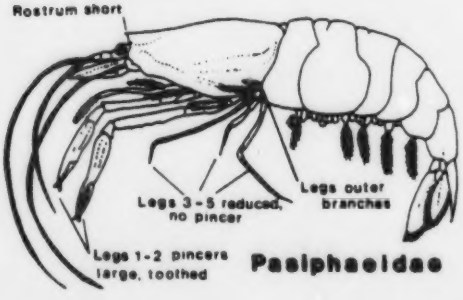


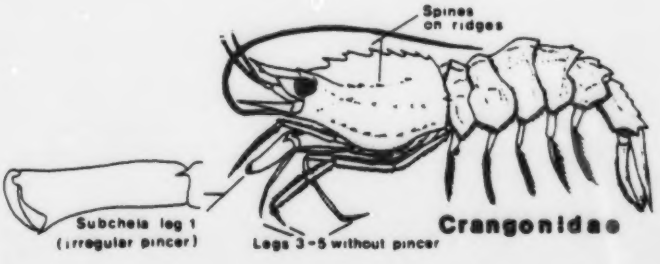












FAMILY OPLOPHORIDAE

HOW TO DISTINGUISH THE GENERA:

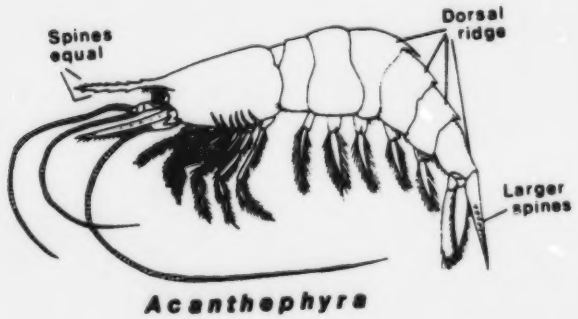
Acanthephyra [p. 9] - carapace firm, without distinct ridges; rostrum with at least as many dorsal as ventral spines; eyes normally developed and well pigmented; last 4 abdominal segments bearing dorsal ridges, some with spines; tip of telson not pointed, armed with dorsolateral spines.

Systellaspis [p. 10] - carapace firm, without ridges; rostrum with more dorsal than ventral spines; eyes normally developed and well pigmented; abdominal segment 6 without dorsal ridge; tip of telson with sharply pointed endpiece, armed with lateral spines.

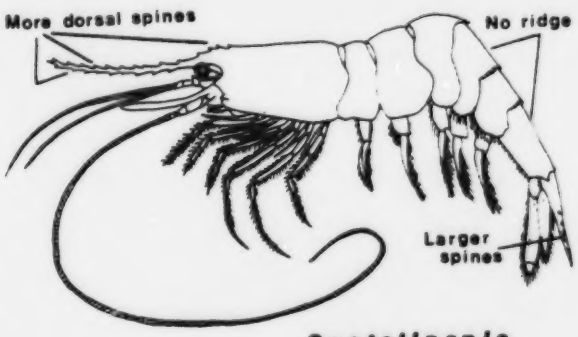
Oplophorus [p. 10] - carapace firm, with indistinct ridges; eyes normally developed; dorsal ridges on abdominal segments 3-5 posteriorly produced into long spines; telson ending in sharp point (with indistinct dorsolateral spines).

Notostomus [p. 11] - carapace thin but not membranous, with distinct ridges along lateral surface; rostrum with more dorsal than ventral spines; eyes normally developed and well pigmented; last 4 abdominal segments with dorsal ridge; tip of telson not pointed, spines at tip only (and very small dorsolateral spines).

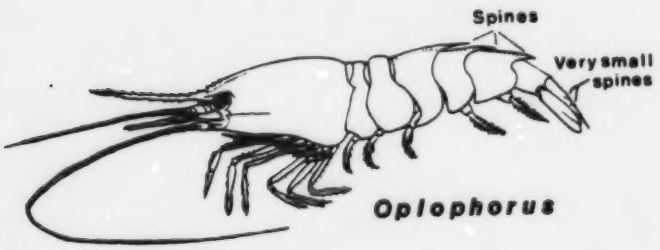
Hymenodora [p. 11] - carapace thin, membranous; short pointed rostrum with more dorsal than ventral spines; eyes very small and poorly pigmented; abdominal segments smooth, without dorsal ridge; tip of telson not pointed (with indistinct dorsolateral spines).



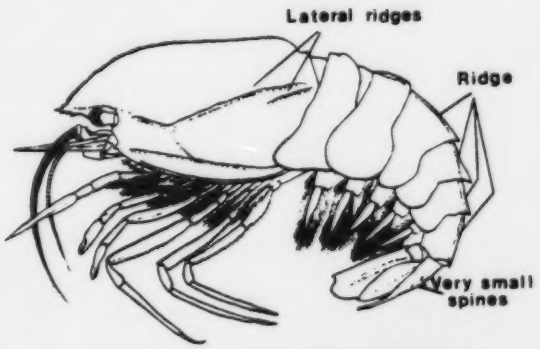
Acanthephyra



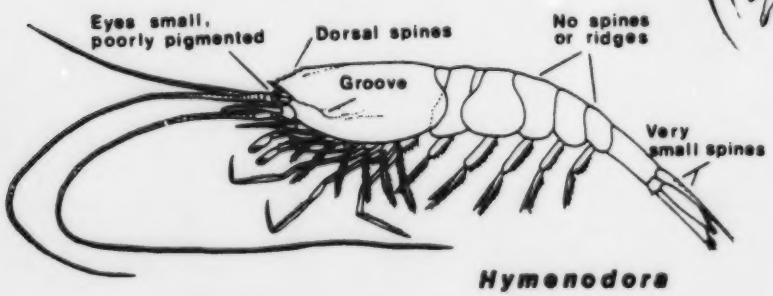
Systellaspis



Oplophorus



Notostomus



Hymenodora

HOW TO DISTINGUISH THE SPECIES:

1) Acanthephyra pelagica (Risso, 1816)

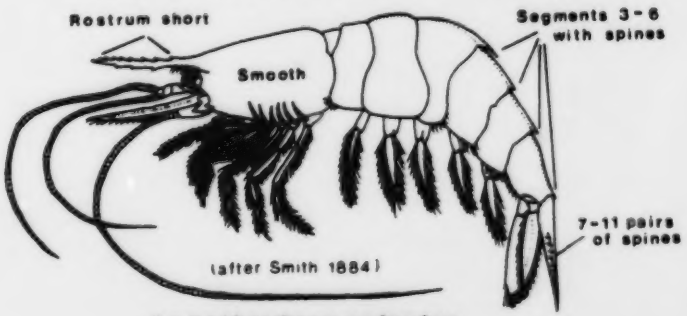
- brilliant scarlet-red
- carapace appears smooth, with 2 lateral spines on anterior margin
- rostrum about as long as carapace (shorter in adults, longer in juveniles), usually with 8 dorsal and 5 ventral spines
- scale of antenna about as long as carapace
- abdominal segments 3-6 each with a middorsal spine posteriorly
- telson with 7-11 pairs of dorsolateral spines
- carapace length to 24 mm males, 31 mm females
- depth range 200-1650 m (commonly below 900 m), 3-12°C
- Latitude 64° (Davis Strait) to 13°N

2) Acanthephyra purpurea A. Milne-Edwards, 1881

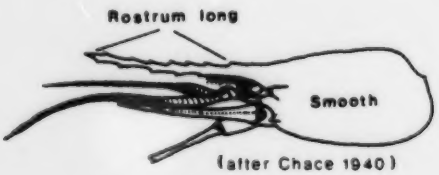
- brilliant scarlet-red
- carapace appears smooth, with 2 lateral spines on anterior margin
- rostrum always longer than carapace, with 8 dorsal and 5 ventral spines
- scale of antenna longer than carapace
- abdominal segments 3, 5 and 6 with middorsal posterior spine; small or no spine on segment 4
- telson with only 4 pairs of dorsolateral spines
- carapace length to 23 mm in males and females
- depth range 100-1500 m (commonly above 600 m), 4-18°C
- Latitude 53° to 23°N

3) Acanthephyra eximia Smith, 1884 (first Canadian record)

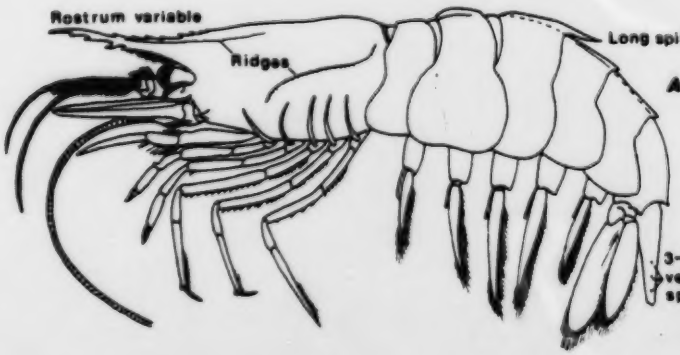
- crimson-red
- carapace with 3 distinct ridges and 2 lateral spines on anterior margin; middorsal ridge extending from rostrum to posterior border; laterally with oblique ridge on each side
- rostrum variable in length, often as long as carapace, distally slightly upturned; dorsally bearing 5-7 spines extending from base of carapace and with 2-5 ventral spines on middle or distal part
- scale of antenna shorter than carapace
- first abdominal segment dorsally rounded, other segments with middorsal ridge, extending into distal spine on segments 3-6; longest spine on segment 3
- telson with 3-5 pairs of very small dorsolateral spines
- carapace length to 41 mm, total length to 140 mm
- depth range 200-3700, benthic
- Latitude 44°N to north of Falkland Islands



Acanthephyra pelagica



Acanthephyra purpurea



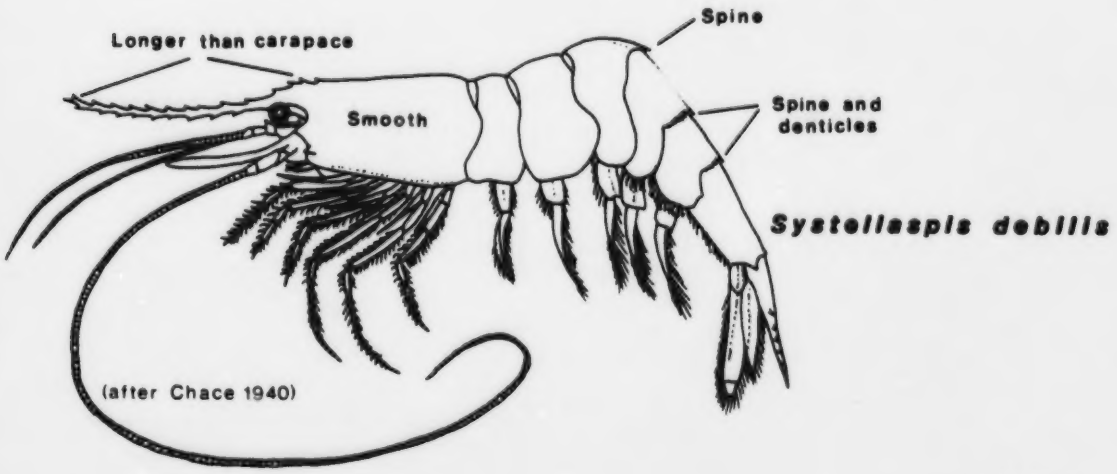
Acanthephyra eximia

4) **Systellaspis debilis** (A. Milne-Edwards, 1881)

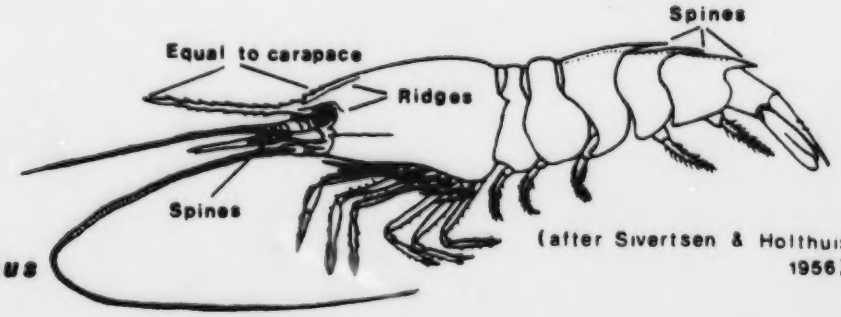
- scarlet-red
- eyes large, at least twice width of eyestalk
- carapace smooth, with 2 lateral spines at anterior margin, lower spine with short ridge
- rostrum slender, sharply tipped, longer than carapace; with 13-19 spines dorsally, 7-8 ventrally; 3-4 spines on crest above eyes
- antennal scale about 0.8 times carapace length
- outer branches of maxilliped 3 and all legs slender and flexible
- abdominal segment 3 with dorsal ridge extending to form a long spine posteriorly, segments 4 and 5 with short spine plus 8 (segment 4) and 4 (segment 5) lateral denticles
- carapace length to 14 mm males and females; smallest females with eggs 11 mm; total length to 85 mm
- depth range 25-3000 m
- Labrador Basin to Gulf of Mexico

5) **Oplophorus spinosus** (Brullé, 1839)

- thorax and abdomen white with scarlet red pigmentation, giving abdomen banded appearance
- carapace dorsally arched, with 2 short lateral ridges extending posteriorly from base of rostrum; 1 lateral groove extending posteriorly from spine below eye
- rostrum slender, tapering to sharp point and curving upward; length about equal to carapace length; 5-19 dorsal and 5-8 ventral spines
- eyes large, at least twice width of eyestalk
- antennal scale with series of spines on outer edge, 1.1 times carapace length
- outer branches of maxilliped 3 and first leg wider and more rigid than in other oplophorid species covered herein
- abdominal ridges produced posteriorly as long spines on segments 3-5
- carapace length to 17 mm males, 14 mm females
- depth range 0-1800 m
- extends north to Latitude 44°N



Systellaspis debilis



Oplophorus spinosus

6) **Notostomus robustus** Smith, 1884

- dark crimson-red
- carapace with 4 longitudinal ridges laterally; second ridge from top short
- rostrum short and pointed, with 1 lateral ridge at base; with a series of about 15 dorsal spines, sequentially decreasing in size posteriorly on middorsal ridge of carapace; 3-4 spines ventrally
- antennal scale about 1/2 carapace length
- middorsal ridge produced into small spine on abdominal segments 3-6
- telson with pair of dorsal ridges, tip sharp, flanked by pair of spines
- carapace length to 51 mm
- pelagic, depth range 850-3000 m
- western North Atlantic to Latitude 43°N, Longitude 60°W

7) **Notostomus elegans** A. Milne-Edwards, 1881

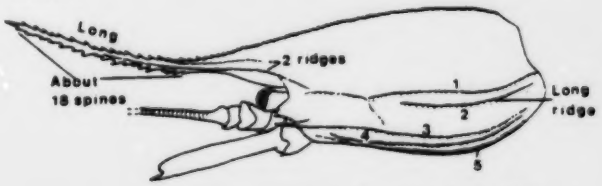
- dark crimson-red
- carapace with 5 longitudinal ridges laterally; second ridge from top long
- rostrum long and pointed, with 2 lateral ridges at base; with a series of about 20 spines dorsally, sequentially decreasing in size posteriorly on middorsal ridge of carapace; about 18 spines ventrally
- carapace length to 45 mm, total length to about 110 mm
- pelagic, depth range 450-5400 m
- south from Latitude 45°N

8) **Hymenodora glacialis** (Buchholz, 1874) **Northern ambereye**

- brilliant blood-red; small amber eyes; antennal flagella with transverse bands
- carapace slightly compressed, with dorsal ridge on anterior half; anterior part of carapace and rostrum form a hood projecting over portion of eyes; with crescent-shaped groove
- rostrum with 4-6 dorsal spines and lateral grooves running backward and downward; upper lateral surfaces swollen
- antennal scale less than 1/2 carapace length
- abdominal segment 6 less than twice length of segment 5
- long telson projects beyond uropods, narrowest at its distal 1/3, becoming broader again terminally
- carapace length to 19 mm
- depth range 0-3900 m but usually below 200 m
- Latitude 42° to 30°N

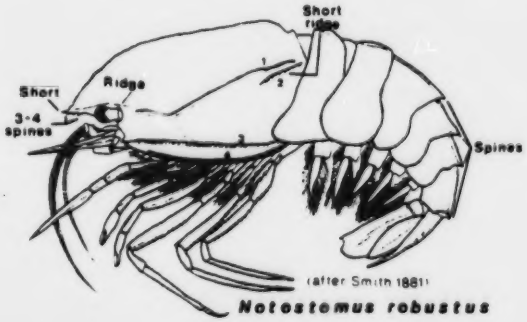
9) **Hymenodora gracilis** Smith, 1886 [no specimens examined]
as *H. glacialis* except:

- carapace without crescent-shaped groove
- rostrum with upper lateral surfaces more or less concave
- depth range 750-5400 but usually below 1000 m
- off southwest Greenland to Bahamas



(after Crosnier & Forest 1973)

Notostomus elegans

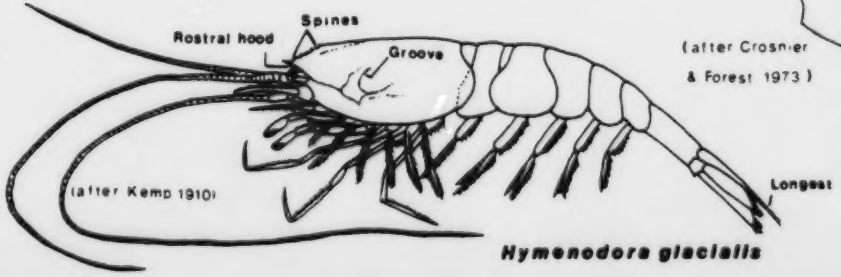


(after Smith 1881)

Notostomus robustus

(after Crosnier & Forest 1973)

Hymenodora gracilis



Hymenodora glacialis

FAMILY NEMATOCARCINIDAE (Spider shrimps)

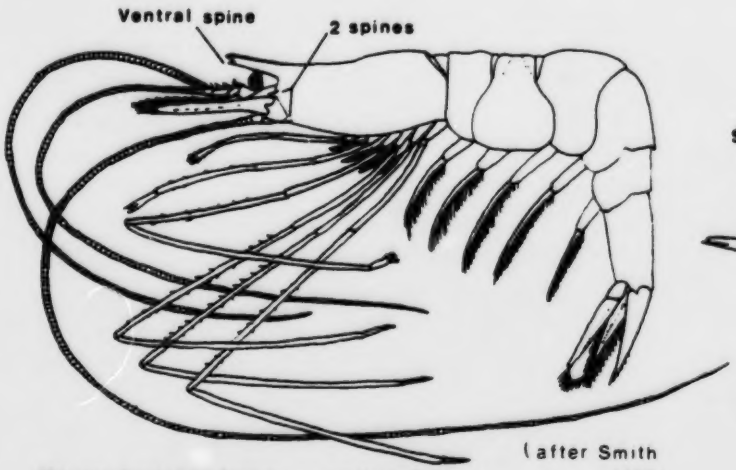
HOW TO DISTINGUISH THE SPECIES:

1) **Nematocarcinus rotundus** Crosnier and Forest, 1973

- crimson-red
- carapace smooth, 2 spines laterally on anterior margin
- short flattened rostrum about 1/4 length of carapace, with 12-17 dorsal spines and 1 ventral spine near tip
- lateral plate of abdominal segment 5 posteriorly culminating in a blunt tip or microscopic spine
- telson without dorsolateral spines on proximal half
- carapace length to 27 mm
- usually benthic, depth range 300-1580 m
- Latitude 44° to 16°N

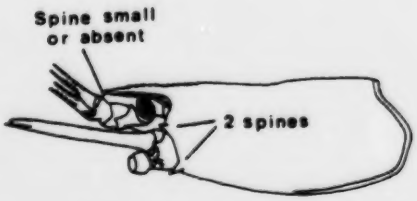
2) **Nematocarcinus cursor** A. Milne-Edwards, 1881

- crimson-red
- carapace smooth, with 2 spines laterally on anterior margin
- rostrum short, with 10-15 dorsal spines; ventral spine very small or absent
- lateral plate of abdominal segment 5 forming a sharp spine posteriorly
- telson with dorsolateral spines on proximal half
- carapace length to 27 mm
- usually benthic, depth range 670-1240 m
- Latitude 43° to 15°N



Nematocarcinus rotundus

(after Smith 1887)

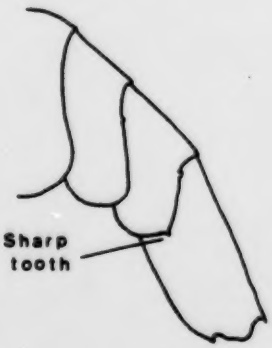


(after Crosnier & Forest 1973)

Nematocarcinus cursor

N. rotundus

(after Crosnier & Forest 1973)



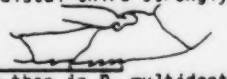
N. cursor

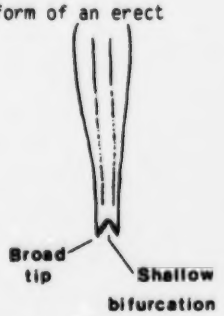
FAMILY PASIPHAEIDAE (Glass shrimps)

HOW TO DISTINGUISH THE SPECIES:

1) **Pasiphaea tarda** Krøyer, 1845 **Crimson pasiphaeid**

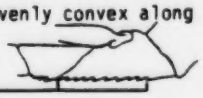
- carapace, most of abdomen and appendages uniform vermilion-red; antenna and antennal scale milky-white with red tint; abdomen dorsally with white patches; eyes black
- carapace more than 1/2 length of abdomen (excluding telson); with lateral spine
- rostrum shorter than in P. multidentata, directed forward but not upward; rostrum in form of an erect spine
- antennal scale less than 1/2 length of carapace; distal third strongly convex (with small, short spine at tip)
- segment 2 of second leg with 0-5 spines
- abdomen unarmed
- telson with broader tip and shallower bifurcation than in P. multidentata
- carapace length to 75 mm, total length to 215 mm
- usually near bottom but also in midwater, depth range 250-2400 m, 1-6°C
- Latitude 65°N (Davis Strait) to off South Carolina

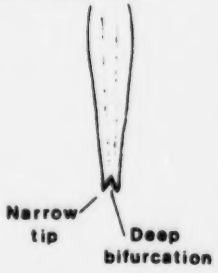




2) **Pasiphaea multidentata** Esmark, 1866

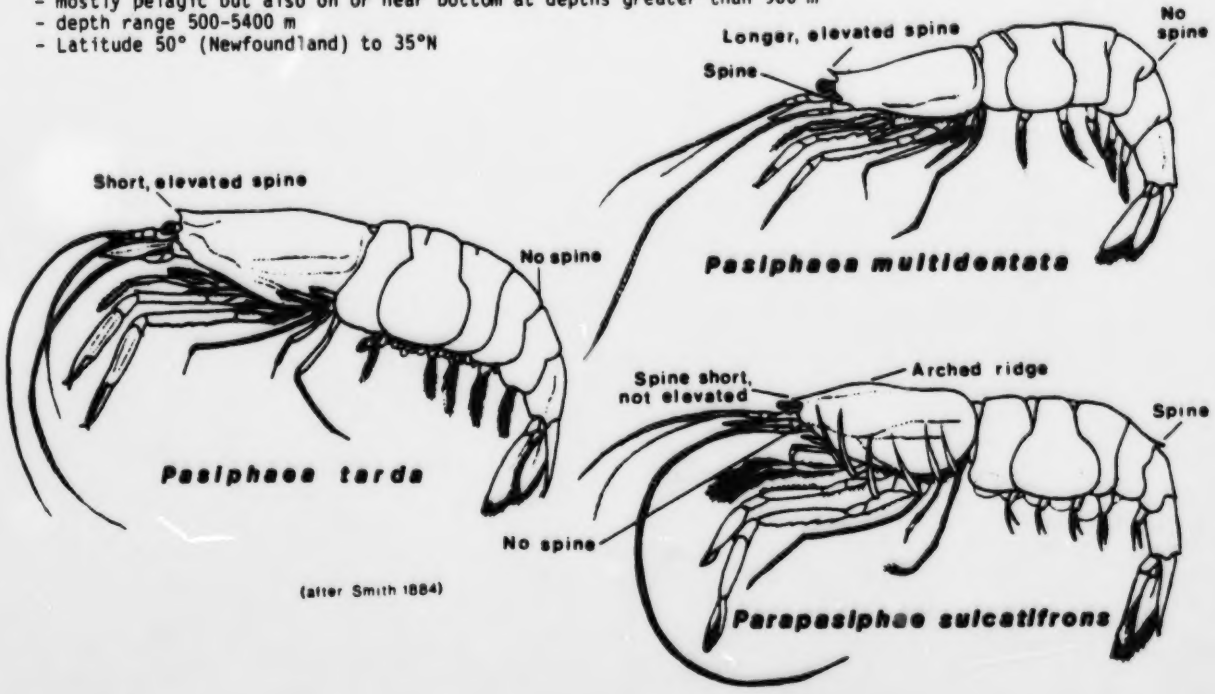
- color variable from mostly translucent and milky-white to reddish-brown; eyes black
- carapace about 1/2 length of abdomen (excluding telson); with lateral spine
- rostrum longer and directed more upward and forward than P. tarda; rostrum in form of an erect spine rising from dorsal ridge
- antennal scale more than 1/2 length of carapace; evenly convex along entire length (with long stout spine at tip)
- segment 2 of second leg with 7-12 spines
- abdomen unarmed
- telson narrow at tip, with deep bifurcation
- carapace length to 20 mm, total length to 100 mm
- usually in midwater but also found on bottom, depth range 10-2000 m, 3.5-8.0°C
- Greenland to Massachusetts (Latitude 41°N)





3) **Parapasiphae sulcatifrons** Smith, 1884 **Grooved-back shrimp**

- color scarlet-red, carapace brightest; eyes without black pigment
- carapace more than 1/2 length of abdomen; without spines; dorsal arch with groove
- rostrum 1/2 length of eyestalk; a normal anterior prolongation of carapace
- segment 2 of second leg with more than 5 spines
- abdomen with small median spine dorsally at end of segment 4
- carapace length to 22.5 mm males, 26 mm females; total length to 83 mm
- mostly pelagic but also on or near bottom at depths greater than 900 m
- depth range 500-5400 m
- Latitude 50° (Newfoundland) to 35°N



(after Smith 1884)

FAMILY HIPPOLYTIDAE

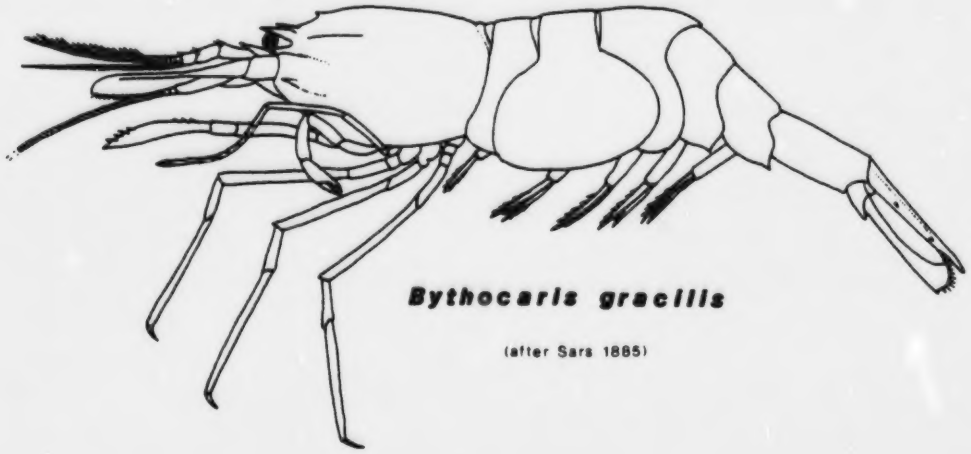
HOW TO DISTINGUISH THE SPECIES:

1) **Bythocaris gracilis** Smith, 1885 [no specimens examined]

- color transparent, rose or pale red appendages
- antennule with lateral spine on first segment shorter, not nearly reaching end of segment
- carapace with middorsal ridge bearing single spine close to rostrum; dorsolateral ridge extending posteriorly from spine above eyes; distinct groove running parallel to dorsolateral ridge
- rostrum broad and short, with 3 spines (1 median and 2 lateral), not extending beyond carapace
- abdomen dorsally smooth, rounded and lacking spines
- telson with 2 pairs of lateral spines, proximal pair on proximal half of telson
- carapace length to 8.4 mm, total length 39 mm
- depth range 550-1900 m
- Davis Strait to Latitude 35°N

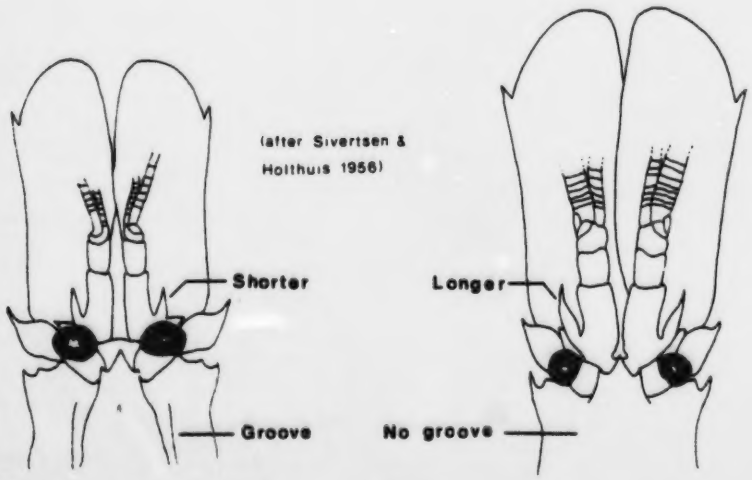
2) **Bythocaris payeri** Heller, 1875 [no specimens examined]

- color unknown
- antennule with lateral spine on first segment longer, nearly reaching end of segment
- carapace with middorsal ridge, single spine close to rostrum may be missing; dorsolateral ridge much shorter than in B. gracilis; without groove parallel to dorsolateral ridge
- rostrum and abdomen as in B. gracilis
- telson with proximal pair of lateral spines on distal half of telson
- carapace length to 11.5 mm, total length 50 mm
- depth range 180-1000 m
- Arctic Ocean to Latitude 43°N

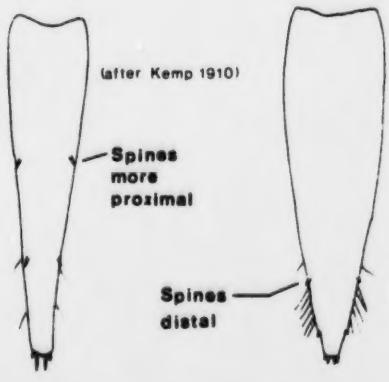


Bythocaris gracilis

(after Sars 1885)



B. gracilis ***B. payeri***



B. gracilis ***B. payeri***

FAMILY PANDALIDAE

HOW TO DISTINGUISH THE GENERA:

Stylopandalus - rostrum 3 times as long as carapace; carapace with 2 middorsal spines; maxilliped 3 with exopod; all legs without exopods or epipods; legs 2 about equal.

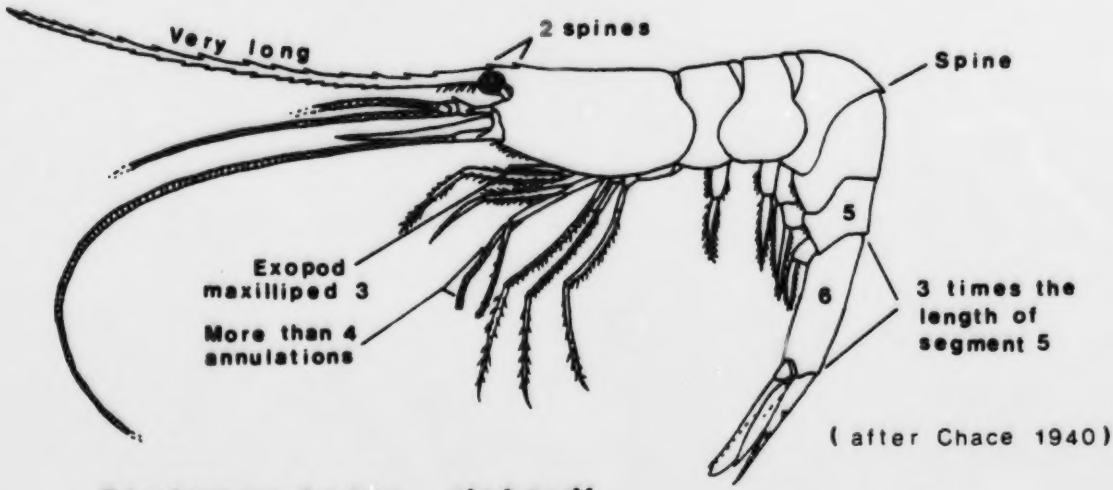
Dichelopandalus - rostrum 1.3-2.0 times as long as carapace; carapace usually with 2 middorsal spines; maxilliped 3 with exopod; all legs without exopods, legs 1-4 with epipods; legs 2 unequal.

Pandalus - rostrum 1-2 times as long as carapace; carapace with 3-4 middorsal spines; maxilliped 3 without exopod; all legs without exopods, legs 1-4 with epipods; legs 2 unequal.

HOW TO DISTINGUISH THE SPECIES:

1) Stylopandalus richardi (Coutière, 1905)

- mature specimens mostly bright scarlet-red, paler on abdomen; young specimens scarlet up to third abdominal segment, fading gradually to white posteriorly
- carapace smooth, without ridges
- rostrum very long, about 3 times length of carapace; 16-18 spines along entire dorsal margin, including 2 larger spines above eyes
- wrist (carpus) proximal to pincer of right leg 2 with more than 4 annulations
- (abdominal segment 3 with a slender movable median dorsal spine posteriorly)
- abdominal segment 6, 3 times as long as high and about 3 times length of segment 5
- carapace length to 9 mm, total length about 70 mm
- strictly pelagic
- 12-1800 m (migrating daily between shallow and deep water), 7.2°C
- Newfoundland south to Gulf of Mexico



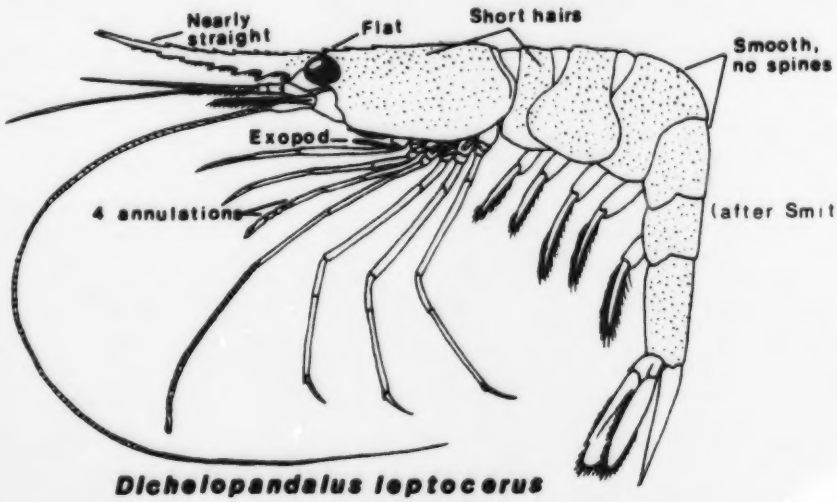
Stylopandalus richardi

2) **Dichelopandalus leptocerus** (Smith, 1881) **Bristled longbeak**

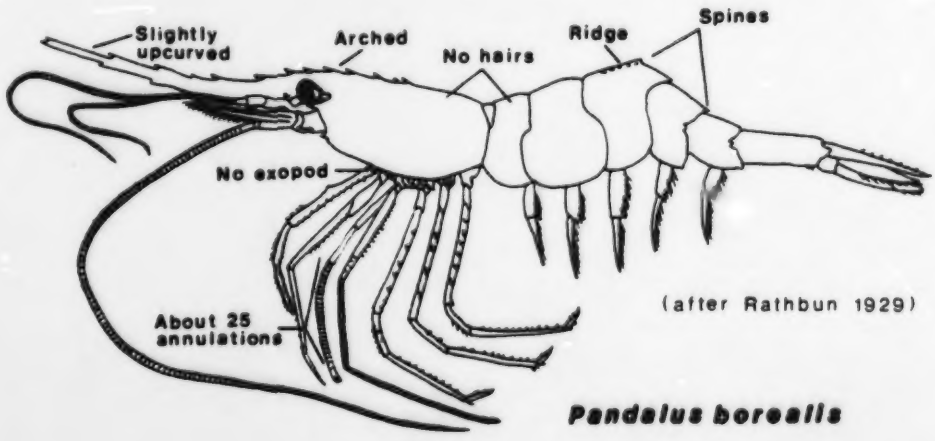
- carapace roughened with short irregular transverse, punctate ridges giving rise to short hairs
- rostrum 1.3-2.0 times carapace length, not arched above eyes and only very slightly upcurved along distal 2/3; tip with 2 spines; 11-13 mostly movable spines dorsally, usually 2 spines on carapace posterior to base of eyes and extending anteriorly about 2/3 to tip; 6-8 fixed ventral spines
- wrist of right leg 2 with 4 annulations
- abdomen rounded, without median spine or ridge
- total length to 100 mm
- benthic, 0-790 m, 0-17°C
- Newfoundland to North Carolina

3) **Pandalus borealis** Krøyer, 1838 **Northern shrimp**

- sprinkled with small red star-shaped pigment spots, forming dark areas where concentrated
- carapace smooth, without ridges
- rostrum 1.0-1.7 times carapace length, slightly arched above eyes and barely upcurved distally; tip with 2 spines; 12-16 movable spines dorsally, first 4 usually on carapace posterior to base of eye and extending anteriorly at least to distal 1/3; 6-8 fixed spines ventrally
- wrist of right leg 2 with about 25 annulations
- abdomen with partly compressed segment 3 bearing distinct dorsal ridge; small median spine on posterior margin of segments 3 and 4
- carapace length to 30 mm; total length to 170 mm
- benthic, 30-1150 m, 1-14°C
- Greenland to Martha's Vineyard, Massachusetts



Dichelopandalus leptocerus



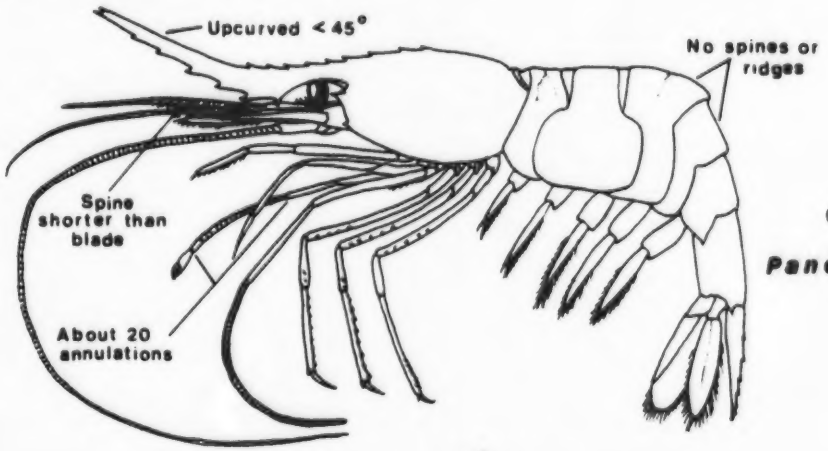
Pandalus borealis

4) **Pandalus montagui** Leach, 1814 **Aesop shrimp**

- usually semi-translucent with red pigment spots giving overall pink color; obliquely transverse red bands on carapace and abdomen
- carapace smooth, no ridges
- rostrum 1.0-1.5 times carapace length, not arched above eyes but distal 2/3 upcurved at less than 45°; tip with 2 spines; 10-12 movable spines dorsally, proximally first 3-4 on carapace posterior to base of eye and extending anteriorly about to middle; 5-6 fixed spines ventrally
- wrist of right leg 2 with about 20 annulations
- abdomen rounded, without median ridge or spine
- carapace length to 24 mm, total length to 110 mm
- benthic, 7-790 m, -1-10°C
- Greenland to Rhode Island

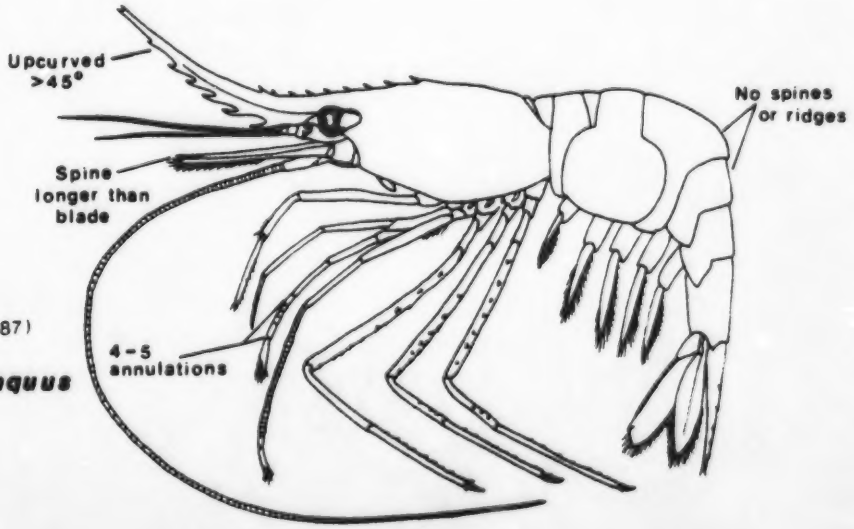
5) **Pandalus propinquus** G. O. Sars, 1869

- carapace often uniform red, rostrum often yellowish toward tip; abdominal segments 1-4 with transverse red bands, segment 5 pale red with darker spots, segment 6 and tail fan darker red; legs pale red except colorless second pair
- carapace smooth, without ridges
- rostrum slightly longer than carapace, not arched above eyes but distally strongly upcurved at an angle of about 45°; tip with 2 spines; 8-10 movable spines dorsally, proximally first 3 spines on carapace posterior to base of eye and extending anteriorly about 1/3; 5-7 fixed ventral spines
- wrist of right leg 2 with 4-5 annulations
- abdomen rounded, without median ridge or spine
- total length to 150 mm, but usually less than 110 mm
- benthic, 20-2000 m but usually 165-350+ m, 3-10°C
- Davis Strait to Delaware



(after Smith 1887)

Pandalus montagui



(after Smith 1887)

Pandalus propinquus

FAMILY CRANGONIDAE

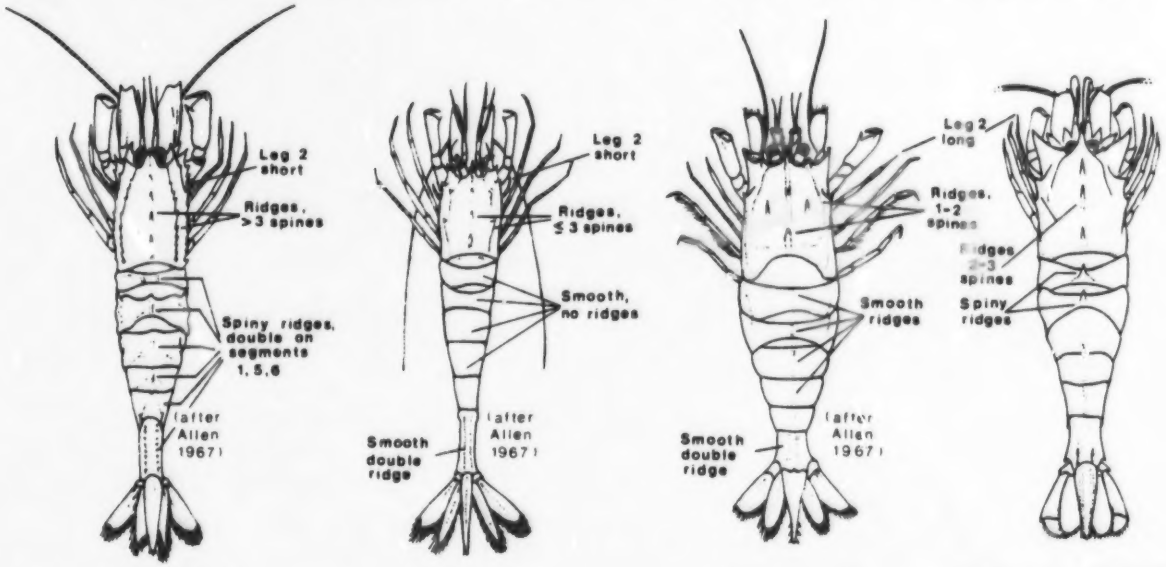
HOW TO DISTINGUISH THE GENERA:

Sabinea - second legs simple, without pincers, shorter than other legs; carapace with 7 spiny ridges (1 middorsal and 3 lateral), each armed with more than 3 spines; abdominal segments with spiny dorsal ridges on all segments, double ridges on segments 1, 5 and 6.

Pontophilus - second legs with pincers, much shorter than other legs; carapace with 5 spiny ridges (1 middorsal and 2 lateral), each armed with not more than 3 spines; first 4 abdominal segments smooth, segment 6 with smooth double ridge.

Metacrangon - second legs with pincers, about same length as other legs; carapace with 3 ridges bearing 1-2 spines each; abdominal segments with smooth dorsal ridges, double ridge on segment 6.

Sclerocrangon - second legs with pincers, about same length as other legs; carapace with 3 ridges bearing 2-3 spines each; abdominal segments 1-5 with spiny median ridges, smooth double ridge on segment 6.

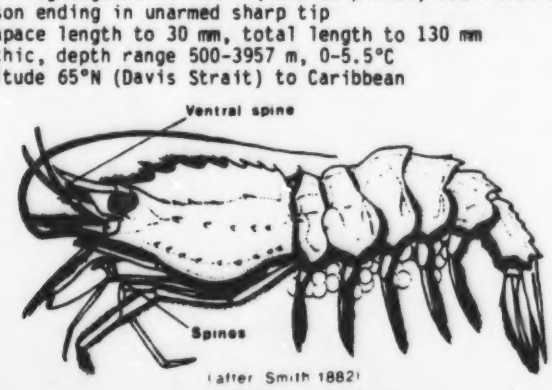


Sabinea *Pontophilus* *Metacrangon* *Sclerocrangon*

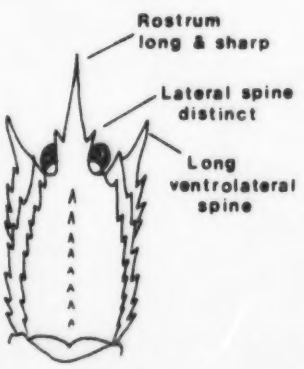
HOW TO DISTINGUISH THE SPECIES:

1) Sabinea hystrix (A. Milne-Edwards, 1881)

- pale grayish-brown
- carapace with long ventrolateral spine at anterior margin
- rostrum sharp, more than 1/2 carapace length, reaching far beyond eyes; with ventral spine near sharp tip and flanked by pair of dorsal spines at base
- first leg segments 4 and 5 (next to pincer) each with distinct spine
- telson ending in unarmed sharp tip
- carapace length to 30 mm, total length to 130 mm
- benthic, depth range 500-3957 m, 0-5.5°C
- Latitude 65°N (Davis Strait) to Caribbean

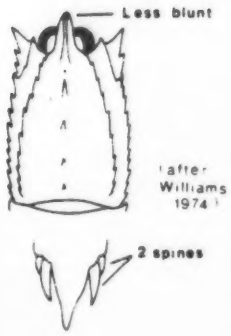


Sabinea hystrix



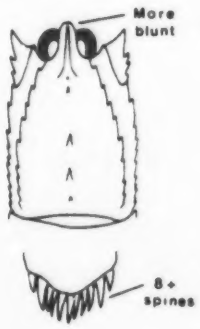
2) Sabinea sarsii Smith, 1879 **Sars shrimp**

- grayish-brown
- carapace with short ventrolateral spine at anterior margin
- rostrum blunt (but more pointed than S. septemcarinata) and short, tip reaching little beyond eyes; without spines
- first leg segments 4 and 5 next to pincer without distinct spine
- telson ending in sharp tip (flanked by 1-2 smaller spines)
- carapace length to 14 mm males, 20 mm females; total length to 62 mm males, 72 mm females
- benthic, found on shells and sand, gravel, stones and sponge
- depth range 48-710 m, 0.6-8.9°C
- Latitude 67° to 40°N (Davis Strait to Nantucket Island)



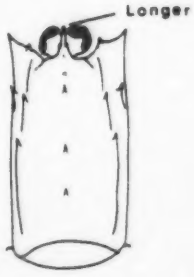
3) Sabinea septemcarinata (Sabine, 1824) **Seven-line shrimp**

- body variegated red and white above, white beneath
- carapace with short ventrolateral spine at anterior margin
- rostrum very short, barely exceeding eye, and with rounded tip
- first leg segments 4 and 5 without distinct spine
- telson with blunt tip (bearing 8 or more terminal spines or setae)
- carapace length to 20+ mm; total length to 45 mm males, 90 mm females
- habitat most commonly mud which may be mixed with stones, shells, gravel and sand
- 0-406 m but less common below 200 m, -1.4-7.4°C
- Latitude 80° (Davis Strait) to 41°N



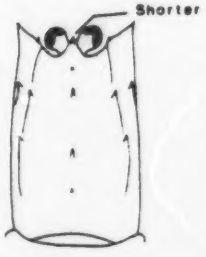
4) Pontophilus norvegicus (M. Sars, 1861) **Norwegian shrimp**

- carapace and abdomen dull reddish brown, last 3 abdominal segments often mottled and darkened; carapace with 2 oblique white bands, traces of white on first two abdominal segments
- carapace with 3 spines on middorsal ridge, 2 spines on first and 1 spine on second lateral ridge
- short rostrum reaching about to distal edge of eyes, with 2 short spines at base
- carapace length to 12 mm males, 19 mm females; length of body to 80 mm
- benthic on mud, sand, gravel and stones
- depth range 50-1450 m (usually 200-500 m), 0.6-10.5°C
- Latitude 67° to 38°N (Davis Strait to Maryland)



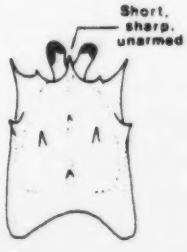
5) Pontophilus brevirostris Smith, 1881 [no specimens examined]

- very short rostrum not reaching end of eye, barely exceeding 2 short lateral spines at base
- carapace with 3 dorsal spines, frequently preceeded by small blunt projection; first lateral ridge with 2-3 spines, second with one
- carapace length about 6 mm; length of body to 37 mm
- benthic, 13-426 m (usually below 100 m), 4.9-12.6°C
- Latitude 41°N (Gulf of Maine) south to Gulf of Mexico



6) Metacrangon jacqueti (A. Milne-Edwards, 1881)

- whitish-brown with yellowish tint
- dorsal ridge of carapace with small spine or tubercle behind rostrum followed by larger spine; 2 anterior and 2 submedian spines laterally
- rostrum unarmed, pointed, very short, not extending beyond eyes
- carapace length to 17 mm, total length to 60 mm
- benthic, depth range 481-1754 m
- Latitude 59° to 32°N



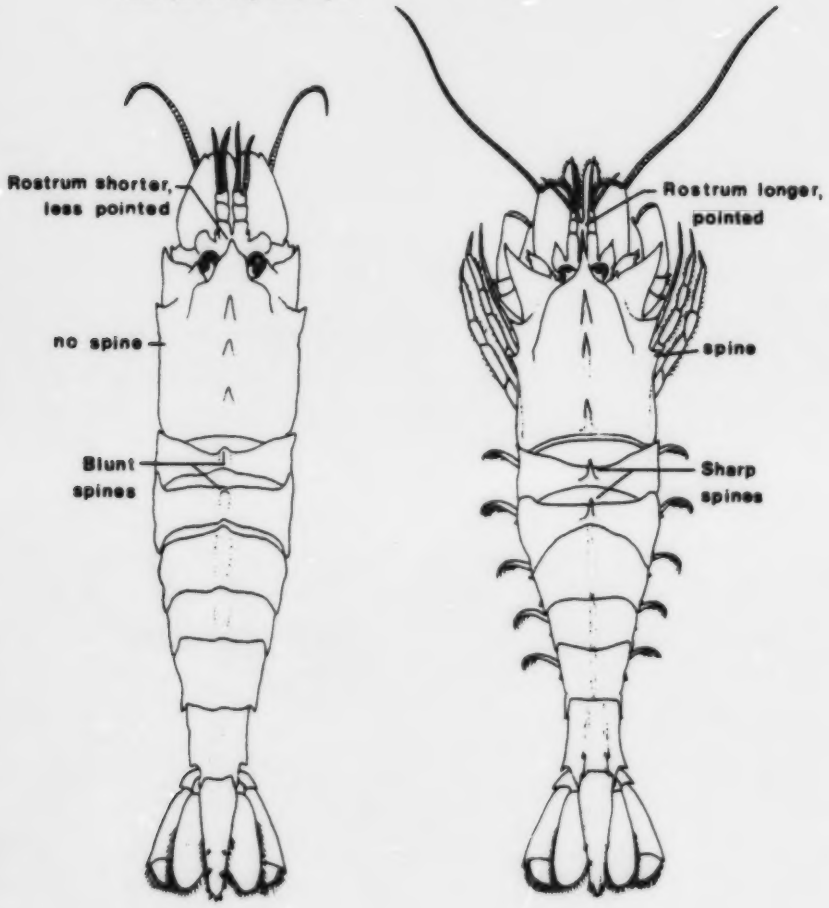
7) Sclerocrangon boreas (Phipps, 1774)

- bright red with reddish-brown spots to brown mottled with ivory, green and yellow
- carapace with 3 spines on middorsal ridge, lateral ridge lacking spines
- rostrum bluntly pointed, directed forward or downward, extending beyond eyes
- abdomen with median ridge not so prominent
- carapace length to 35 mm, total length to 130 mm
- benthic, 0-280 m, rare below 200 m

8) Sclerocrangon ferox (G.O. Sars, 1877)

- reddish-brown, often mottled with ivory
- carapace with 2 larger and 1 smaller spine on middorsal ridge, lateral ridge armed with 2 or more spines
- rostrum sharply pointed, directed forward and upward, extending beyond eyes
- abdomen with distinct median ridge, especially on segments 1-3
- carapace length to 31+ mm, total length to 130 mm
- benthic, depth range 90-1000 m, commonly below 200 m, -0.5-3.6°C
- Latitude 82° to 57°N (Grand Banks)

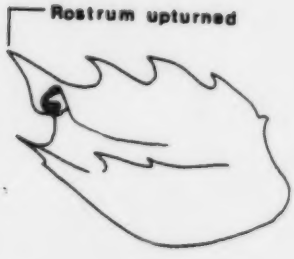
Note: The closely related species S. boreas, which is commonly found in shallow water, has occasionally been found below 200 m. In S. boreas the rostrum is shorter, less acute and not upturned; carapace spines and abdominal spines on segments 1 and 2 are fewer or smaller; and the telson is broader and less pointed; see 7).



Sclerocrangon boreas (after Butler 1980)

Sclerocrangon ferox (after Sars 1885)

S. boreas



S. ferox

FAMILY POLYCHELIDAE (ERYONIDAE)

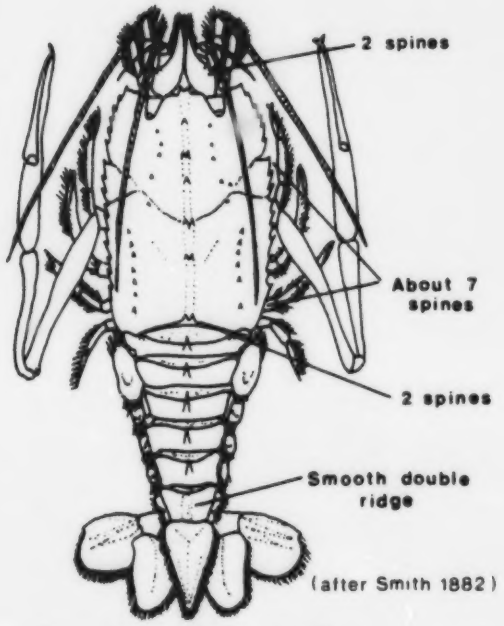
HOW TO DISTINGUISH THE SPECIES:

1) Stereomastis sculpta (Smith, 1880)

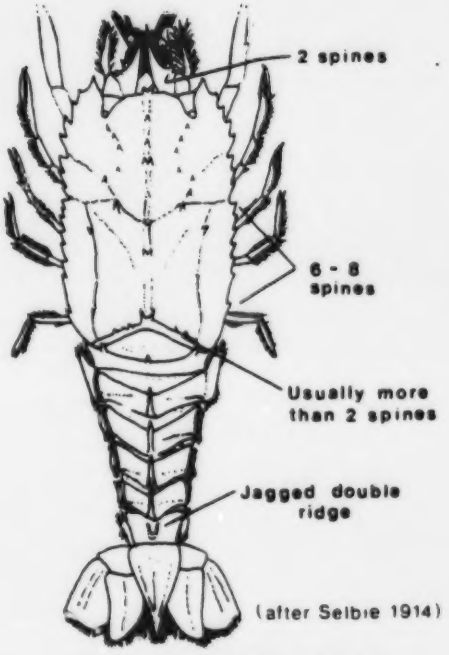
- mostly milky-white with pink; appendages pinkish-red
- first segment of antennule with 2 lateral spines
- lateral margin of carapace not expanded posteriorly, spines in 3 groups (6 + 3 + 7 spines from front to back); posterior margin of carapace unarmed other than a pair of spines on midline
- abdominal segments 1 to 5 each with a single forwardly directed middorsal spine; segment 6 with double ridge; edges of ridges smooth
- carapace length to 70 mm
- benthic, depth range 230-4000 m, 4.3-5.0°C
- Latitude 57°N (Davis Strait) to Caribbean Sea

2) Stereomastis nana (Smith, 1884) [no specimens examined]

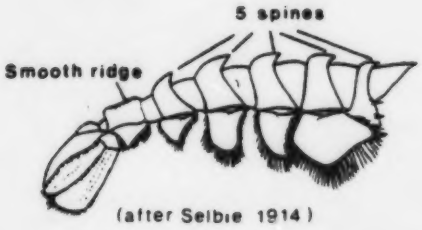
- first segment of antennule with 2 lateral spines
- lateral margin of carapace not expanded posteriorly; spines in 3 groups (6 + 3 + 6-8 spines); posterior margin on each side of midline armed with 2-5 spines
- abdominal segments 1 to 5 each with single forwardly directed middorsal spine; segment 6 with dorsal double ridge; edges of ridges jagged
- carapace length to 45 mm
- benthic, depth range 457-3506 m but usually below 1200 m, 2.4-5.0°C
- Davis Strait and southward



Stereomastis sculpta



Stereomastis nana



***Stereomastis sculpta* abdomen**

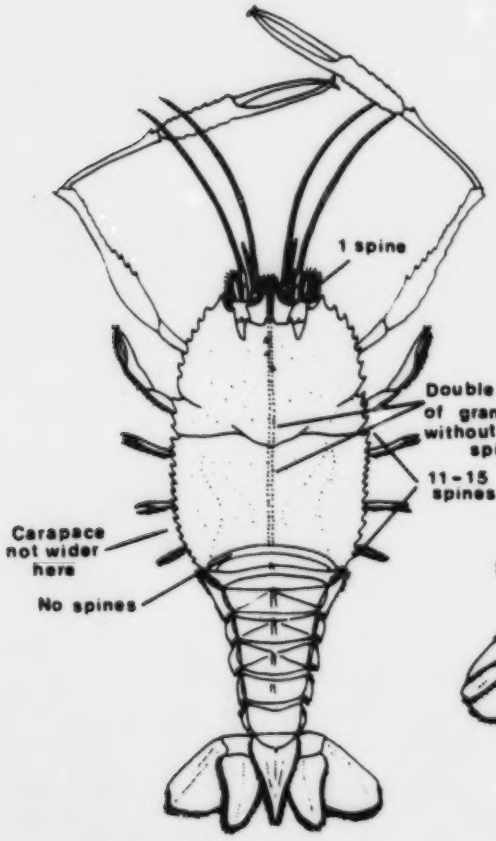
***Stereomastis nana* abdomen**

3) **Polycheles granulatus** Faxon, 1893

- first segment of antennule with single lateral spine
- carapace wide, with lateral margin bearing less than 38 spines not decreasing in size posteriorly; lateral spines in 3 groups varying from 6 + 3 + 11 to 10 + 3 + 15 (usually 7 + 3 + 14); with faint median ridge marked anteriorly by small spines in no definite order and posteriorly by a double row of granules; posterior margin unarmed
- abdominal segments 1-5 each with median ridge, ridges of segments 1-3 extended into anteriorly directed spine; segment 6 smooth, without dorsal double ridge
- carapace length to 50 mm; total length to about 110 mm
- benthic, depth range 347-2505 m, 3.4-4.4°C
- south from Latitude 49°N (Newfoundland)

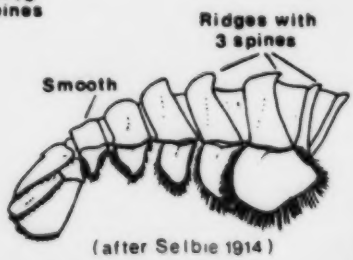
4) **Polycheles validus** (A. Milne-Edwards, 1880) [no specimens examined]

- first segment of antennule with single lateral spine
- carapace wider posteriorly; lateral margin with more than 38 spines, decreasing in size posteriorly; lateral spines from front to back in 3 groups (8-9 + 4-5 + 26-36 spines); median dorsal ridge with 2-3 pairs of spines, followed by double row of granules; posterior margin unarmed
- abdominal segments 1-5 with low dorsal ridge lacking spines; segment 6 without double ridge
- carapace length to 57 mm males, 80 mm females
- benthic, depth range 1698-3365 m, 2.9-3.3°C
- Latitude 43°N to Gulf of Mexico



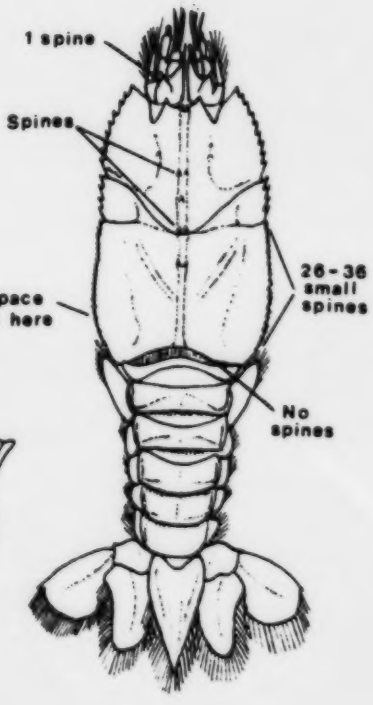
(after Selbie 1914)

Polycheles granulatus



(after Selbie 1914)

***P. granulatus* abdomen**



(after Smith 1887)

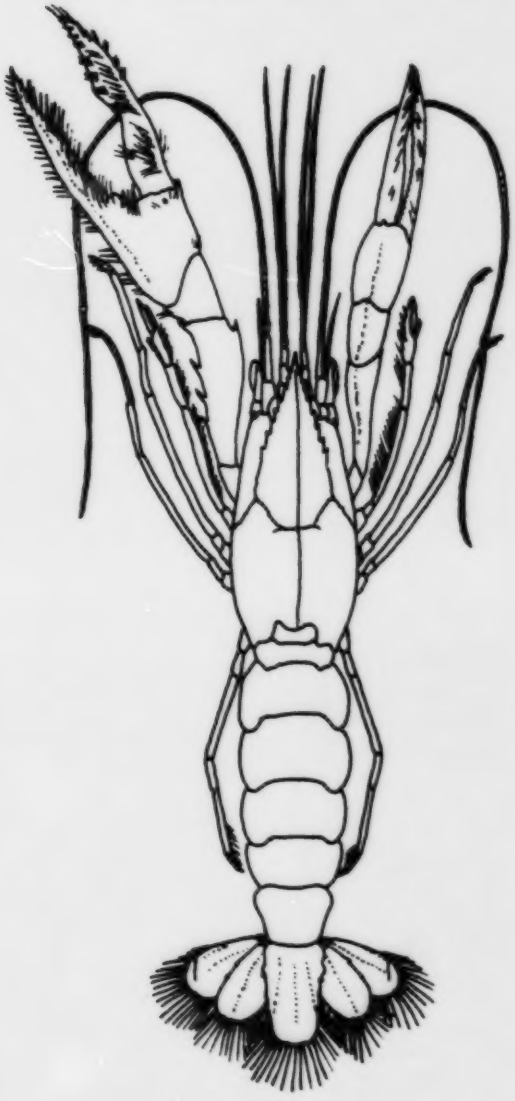
Polycheles validus

FAMILY AXIIDAE

HOW TO DISTINGUISH THE SPECIES:

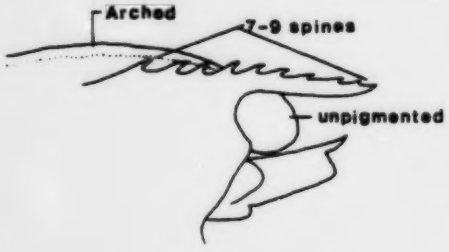
1) **Calocaris templemani** Squires, 1965

- delicate pink or pale rose
- eyes unpigmented and with rudimentary stalks
- carapace arched with apex near middle; middorsal ridge extending full length; with transversely oblique groove
- rostrum angled downward, extending posteriorly as lateral ridge, each side armed with 7-9 spines
- large claws of first leg fringed with many long setae
- abdomen with dorsal tuft of long setae on each side of midline on segments 2-5
- telson rounded posteriorly, with pair of marginal spines and few very small dorsal spines
- carapace length 14 mm, total length 44 mm
- Newfoundland, Gulf of St. Lawrence south to Gulf of Maine
- burrows in mud, 200-700 m



Calocaris templemani

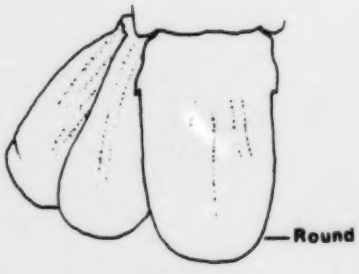
(after Rathbun 1929)



carapace, rostrum lateral view

left pincer

(after Williams 1984)



tail fan

FAMILY GALATHEIDAE

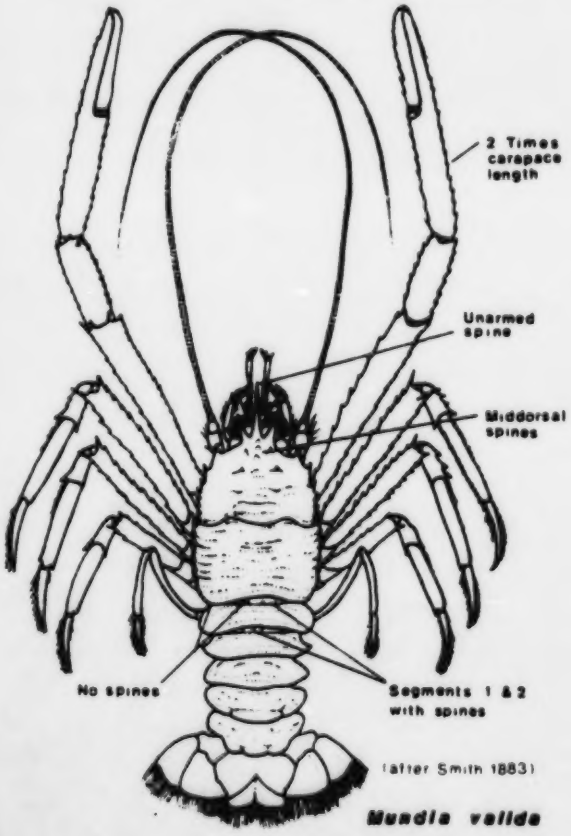
HOW TO DISTINGUISH THE SPECIES:

1) **Munida validа** Smith, 1883

- eyes pigmented and with facets
- carapace lightly calcified, armed with about 7 spines on lateral margin; several smaller spines further dorsally, including on midline behind rostrum, largest pair behind lateral prongs of rostrum; posterior margin without spines
- rostrum a 3-spined prong; middle spine straight, smooth and about twice length of lateral spines; rostrum shorter than antennules
- antennae much longer than carapace (incl. rostrum), reaching far beyond extended first legs with pincers
- first legs about twice carapace length (incl. rostrum)
- abdomen dorsally armed with series of small spines on anterior margin of segments 1 and 2
- carapace length (incl. rostrum) to 83 mm
- benthic, depth range 441-1150 m, 5.0°C
- Latitude 43°N to Caribbean Sea

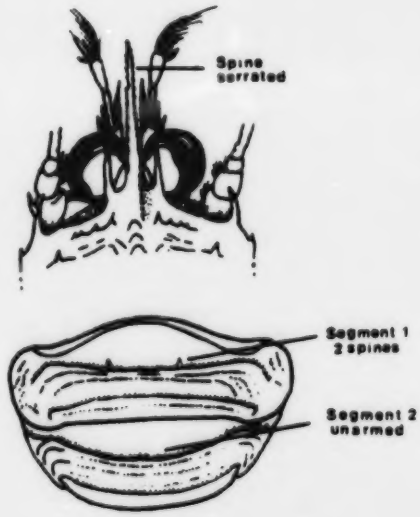
2) **Munida iris** A. Milne-Edwards, 1880

- eyes pigmented and with facets
- carapace lightly calcified; about 7 spines on lateral margin; behind each lateral spine of rostrum a series of 3 or more spines across carapace, largest one closest to midline; 4 single spines behind the latter series, in front of transverse groove; 2-8 spines behind transverse groove; posterior margin without spines
- rostrum a 3-spined prong; middle spine straight, finely serrated, more than twice length of lateral spines; rostrum shorter than antennules
- antennae much longer than carapace (incl. rostrum), reaching end of extended first legs with pincers
- first legs extremely long, about 3 times carapace length (incl. rostrum)
- abdomen armed only on segment 1, usually with 1 pair of small spines on anterior margin (occasionally with second or third pair)
- carapace length (incl. rostrum) to 47 mm males, 45 mm females
- benthic, depth range 43-613 m, 3.9-14.4°C
- Browns Bank (Latitude 42°N) to South America



(after Smith 1883)

Munida validа



(after Williams 1984)

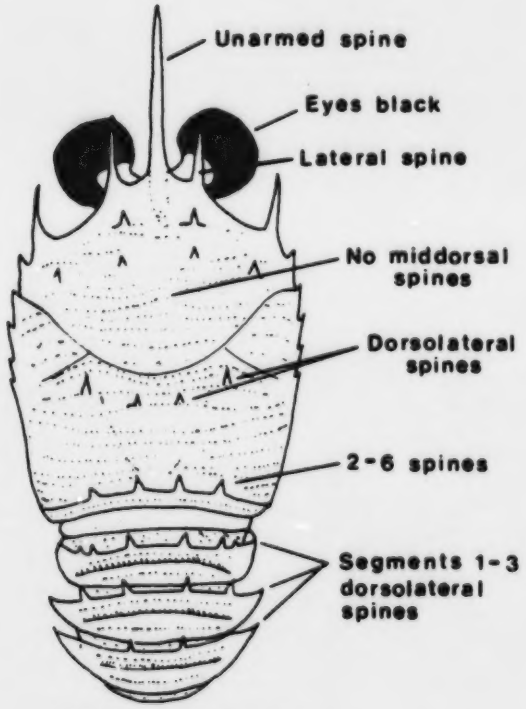
Munida iris

3) **Munida tenuimana** G.O. Sars, 1871

- greyish-pink
- eyes pigmented and with facets
- carapace lightly calcified; usually with 6-7 spines on lateral margin, 2-6 spines on posterior margin; without middorsal spines; with dorsolateral spines, 3-5 pairs anterior and 1-2 posterior to transverse groove
- rostrum a 3-spined prong, middle spine straight, without serrations, not more than twice length of lateral spines; shorter than antennules
- antennae much longer than carapace (incl. rostrum), may reach end of extended first legs with pincers
- first legs extremely long, more than 3 times carapace length (incl. rostrum)
- abdomen armed on segments 1, 2, 3 (and sometimes 4) with a transverse series of 2 or more spines
- carapace length to 31 mm
- benthic, 440-650 m, 3.5-4.4°C
- Latitude 66° (Davis Strait) to 46°N

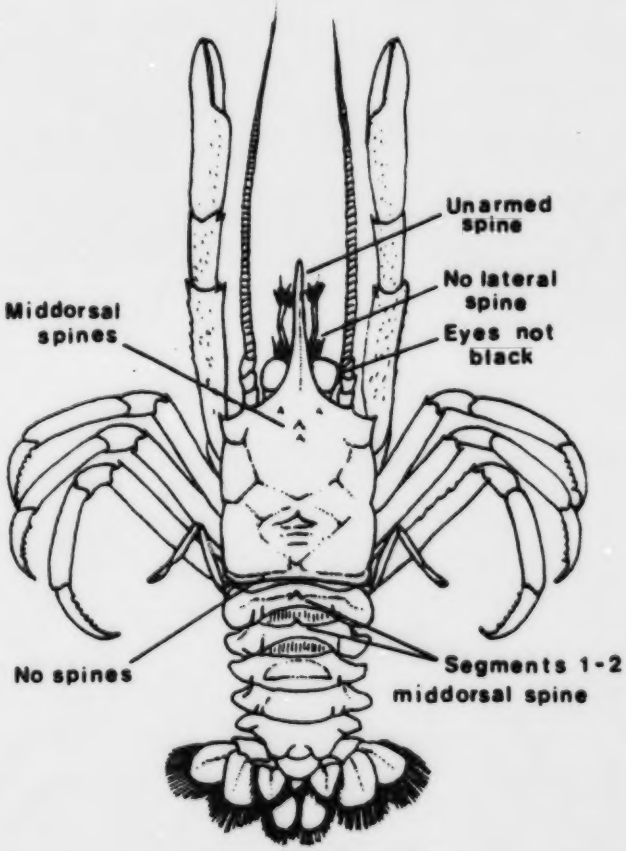
4) **Munidopsis curvirostra** Whiteaves, 1901

- eyes opaque, lacking facets and dark pigment (orange when alive)
- carapace thick, strongly calcified; 1 anterior spine on lateral margin; usually with 1 pair of small spines posterolaterally to rostrum, followed by 1-2 middorsal spines
- rostrum well developed, extending beyond antennules, curved upward, without lateral spines (rarely with very small spines)
- antennae as long as carapace (incl. rostrum), reaching up to tip of extended first leg with pincers
- first legs about as long as carapace (incl. rostrum)
- abdomen armed on segments 1 and 2 with single middorsal spine
- carapace length (incl. rostrum) to 25 mm
- benthic, depth range 135-2325 m, 1.5-2.7°C
- Latitude 66°N (Davis Strait) to North Carolina



(after Selbie 1914)

Munida tenuimana



(after Smith 1882)

Munidopsis curvirostra

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GLOSSARY OF TERMS USED IN THE GUIDE

abdomen	- body region posterior to carapace; the "tail"
antenna	- second and more lateral of the 2 paired appendages on anterior end of body
antennal scale	- lateral rigid lamellar outgrowth of antenna
antennule	- first, or inner, paired appendage projecting from anterior end of body
anterior	- of, pertaining to, or toward the front; "head end"; opposite of posterior
anterolateral	- front side of a structure
article	- any one of the divisions of a segmented appendage
carapace	- "head shield", hard protective covering over segments anterior to abdomen
cephalothorax	- fused part of body anterior to abdomen
chela	- claw or pincer, consisting of the 2 distal segments of a pereiopod, in which a movable finger opposes a fixed finger formed by a distal extension of the next to last segment
distal	- situated away from point of origin or attachment; in limbs, furthest from body; opposite of proximal
dorsal	- pertaining to the back; opposite of ventral
dorsolateral	- upper side of a structure
endopod	- inner branch of a two-branched appendage
epipod	- process arising from basal joint of limb, which may extend into gill chamber
exopod	- outer branch of a two-branched appendage
flagellum	- the distal multiarticulate whip-like portion of antennules or antennae
lateral	- pertaining to the side; located away from the midline
maxilliped	- one of 3 paired mouthparts anterior to pereiopods; most prominent third (outer) maxilliped resembles pereiopods
middorsal	- upper middle of a structure
peduncle	- the combined basal segments of antennules and antennae proximal to the flagellum
pereiopod	- one of 5 walking limbs, with or without chela, attached to the cephalothorax
pleopod	- one of the paired swimming limbs on first 5 abdominal segments
posterior	- of, or pertaining to, the rear end; opposite of anterior
proximal	- toward or near to the point of origin or attachment; opposite of distal
rostrum	- the "head spine", or anterior projection between eyes
seta	- bristle-like flexible outgrowth of body or appendage
spine	- sharp and stiff outgrowth of body or appendage
subchela	- imperfectly chelate; pincer in the family Crangonidae where terminal segment folds back against next to last segment
tail fan	- consisting of 2 pairs of uropods and telson
telson	- terminal unit of abdomen bearing the anus
uropod	- one of paired appendages on last abdominal segment
ventral	- pertaining to the underside, the side opposite the back;opposite of dorsal

APPENDIX A

Other shrimp-like Crustacea not included with decapod crustaceans.

Order Decapoda:

Carapace fused to all thoracic segments; first 3 pairs of thoracic limbs modified as maxillipeds; gills generally covered by carapace; without light organs or female ventral brood pouch; total length 25-350 mm.

Order Euphausiacea (Krill):

Carapace fused to all thoracic segments; none of thoracic limbs modified as maxillipeds, appearing uniform (last 1 or 2 pairs may be shortened) and lacking pincers in most species; gills not hidden by carapace, arranged in a single series, attached to exopodites of limbs, and increasing in size posteriorly; usually with 10 round light organs (photophores), one in each eyestalk, a pair on bases of second and seventh thoracic limbs, and one between bases of first 4 pairs of pleopods; females without ventral brood pouch; total length usually 10-60 mm.

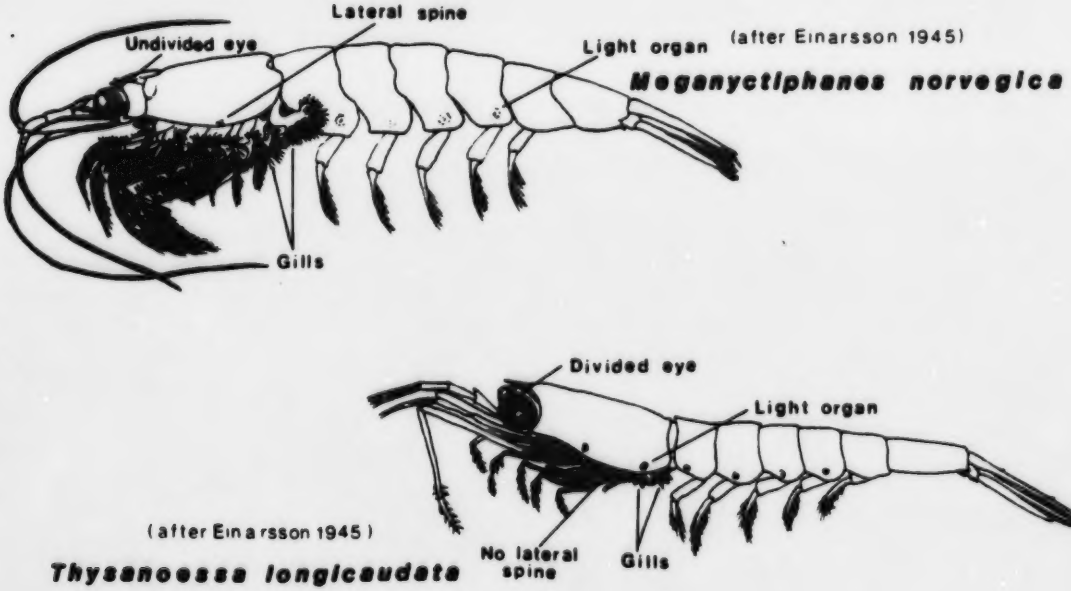
Two contrasting examples:

1) **Meganyctiphanes norvegica** (M. Sars, 1857)

- eyes circular, undivided
- carapace with lateral spine
- antennule with a reflected leaflet on the first segment
- thoracic legs nearly uniform in structure; eighth pair rudimentary, seventh pair shorter
- total length to 50 mm
- 140-4000 m, usually close to sea bottom in 100-500 m during the day
- Latitude 70 to 30°N

2) **Thysanoessa longicaudata** (Krøyer, 1846)

- eyes divided into 2 sections
- carapace without lateral spine
- antennule without a reflected leaflet
- second pair of thoracic legs greatly elongated
- total length to 16 mm
- near surface to 2500 m
- Latitude 70 to 25°N

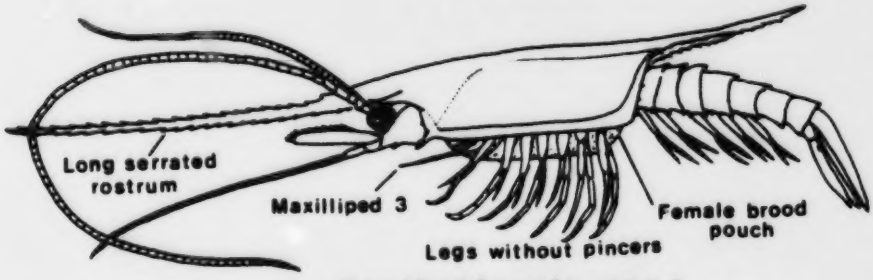


Order Mysidacea (Opossum shrimps):

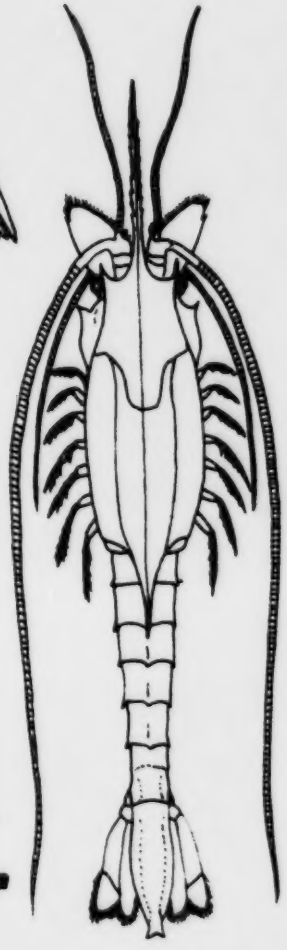
Carapace not fused to last 4 thoracic segments, i.e. with free and movable segments under carapace; first thoracic limbs modified as shortened maxillipeds, other thoracic appendages uniformly elongate, lacking any pincers; gills, when present, enclosed by branchial chambers under carapace; females with a ventral thoracic brood pouch made of plate-like processes projecting inward and overlapping with each other; total length usually 20-30 mm, some up to 350 mm.

Gnathophausia zoea Willemoes-Suhm, 1875

- rostrum long and serrated, becoming shorter relative to body in larger specimens
- bathypelagic
- total length up to 350 mm from tip of rostrum to tip of telson
- 1000-3720 m
- Newfoundland and southward



Gnathophausia zoea



(after Nouvel 1950)

Gnathophausia zoea